Environmental Impact Analysis Process

Environmental Assessment
U.S. Air Force, Military Airlift Command

Repair and Extension of
Taxiways A, AA, and E
Kirtland Air Force Base, NM
August 1991

Department of the Air Force

REPORT DOCUMENTATION PAGE

Form Approved
OMB No 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	AUGUST 1991	Final, 1991

4. TITLE AND SUBTITLE
Environmental Assessment for the Repair & Extension of Taxiways A, AA, and C Kirtland AFB, NM

5. FUNDING NUMBERS
Q

6. AUTHOR(S)
USAF

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
USAF
Military Airlift Command
Scott AFB, Illinois

8. PERFORMING ORGANIZATION REPORT NUMBER
Q

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
-see Block 7-

10. SPONSORING / MONITORING AGENCY REPORT NUMBER
Q

11. SUPPLEMENTARY NOTES
N/A

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release;
Distribution is unlimited

12b. DISTRIBUTION CODE
A

13. ABSTRACT (Maximum 200 words)
EA to support Albuquerque Aviation Dept. Lease @ Kirtland AFB.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Kirtland EA	50
	16. PRICE CODE: Q

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLAS	UNCLAS	UNCLAS	UL

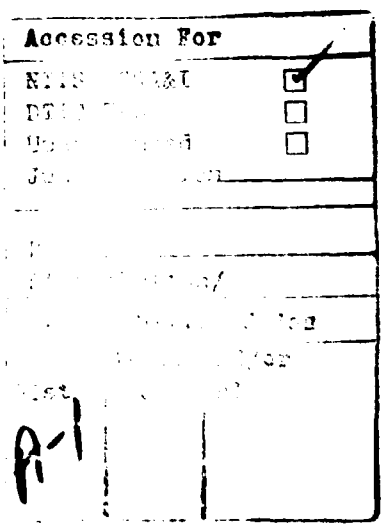
Environmental Assessment for the Repair and Extension of Taxiways A, AA, and E

Kirtland Air Force Base
New Mexico

Prepared for

Department of the Air Force
Headquarters Military Airlift Command
Scott Air Force Base, Illinois
and
Armstrong Laboratory/OEBE
Brooks AFB, Texas

August 1991



EXECUTIVE SUMMARY

The Albuquerque Aviation Department proposes to lease approximately 70 acres of Air Force property at Kirtland Air Force Base (KAFB), New Mexico to make improvements to the Albuquerque International Airport (AIA). The proposed improvements consist of reconstructing and extending Taxiway E and constructing a new taxiway, AA. An existing taxiway, A, will be removed and reconstructed upon completion of Taxiway E. Lighting and drainage improvements which comply with Federal Aviation Administration (FAA) standards are part of the proposed project. The AIA is a joint-use facility owned by the City of Albuquerque that serves KAFB and commercial carriers.

This Environmental Assessment (EA) will be used by the Air Force to decide whether to grant a 20-year lease to the AIA for widening and extending taxiways onto Air Force property. This EA describes and evaluates the potential environmental impacts associated with the construction and operations of Taxiways A, AA, and E on Air Force land use, aircraft operations, and environmental components (air quality, noise, water resources, biological resources, cultural resources, socioeconomics, transportation, and environmental management). This EA also identifies and evaluates impacts associated with relocating Base Operations at each of four alternative sites.

The construction of Taxiway AA will necessitate relocating Base Operations facilities. Of the four alternative sites the Air Force is considering implementing, the preferred alternative, relocating to Hanger 1002 (Naval Weapons Evaluation Facility), is not expected to significantly impact land use, aircraft operations or environmental components. The land use designated for the relocation of Base Operations and the construction of Taxiways A, AA, and E are consistent with the present use of the land, and significant impacts are not expected.

Access to Hot Pad 1, located along Taxiway E, will be disrupted intermittently by construction activities. The arm-dearm pad located on Taxiway E will temporarily be relocated to Hot Pad 3 and some operational impacts are expected during joint use of this area with other tenants. Other tenants along Taxiway A will be inconvenienced during construction. However, significant impacts to tenants along Apron B may occur if alternative access routes are not provided to them during construction of Taxiways A and AA.

Construction activities associated with the proposed action may affect flying and training activities of some tenant organizations since partial closure of Runway 8-26. will require aircraft to taxi longer distances to the alternate runway, 17-35. Use of Runway 17-35 when Runway 8-26 is shut down will increase aircraft traffic along its

taxiways and may delay departures and arrivals of commercial and military aircraft. In addition, use of Runway 17-35 will increase air traffic over the City of Albuquerque.

Noise modeling indicates that significant noise impacts will occur from use of Runway 17-35 during the temporary shut down (4 months) of Runway 8-26. There will be a noise reduction impact for many base facilities presently affected. Approximately 3,600 base personnel are estimated to fall within the 65 dB(A) L_{dn} contour under existing conditions as compared to about 2,450 people when Runway 17-35 will be used. However, aircraft operation noise resulting from use of Runway 17-35 will impact a different group of sensitive receptors including the technical library, a different group of family housing (enlisted personnel), youth center, public school, and guest housing. At this level of noise, all activities (including sleep) at these sensitive receptor locations would be interrupted.

Construction work and possible use of an onsite asphalt batch plant will cause short-term impacts to air quality. Air modeling indicates that increased emissions of total suspended particles will occur during construction activities if proper mitigative measures are not utilized. Other air pollutants are not anticipated to cause a significant impact. Long-term impacts of the project are minimal, since none of the proposed changes to the airfield will result in any new emission sources.

No impacts to the quality of the land, groundwater, or surface water would result from implementation of the proposed action. Small areas of vegetation would be removed during construction activities, but this would not significantly reduce ecological resources in the area, including any threatened or endangered species. No effects are expected on known archaeological sites or historical resources.

The proposed project will enable the airport to accommodate the expected growth in commercial air traffic and enhance airport capabilities for handling military traffic. This may produce some positive long-term economic benefits associated with business activities and tourism.

During construction of the proposed project, the road system surrounding the base will experience a slight increase in vehicular traffic. Most construction-related traffic is expected to enter the project area through KAFB's South gate on Kirtland Road. The increase in traffic through this gate is not expected to interfere with KAFB operations.

Construction-related waste material would consist of concrete and asphalt, metal, lumber, and demolition debris. It is expected that most of the asphalt will be recycled at the asphalt batch plant. Unusable subgrade material could be disposed of at one of the landfills on base without significantly reducing the landfills' capacity.

Implementation of the proposed action would relieve aircraft traffic congestion, improve access to and from Runway 8-26, and eliminate ponding of water on the taxiways and runways. Increased storm water flows to the arroyo would be collected in a retention basin to keep downstream erosion to a minimum. Most impacts associated with the proposed action are construction-related and, therefore, of relatively short duration. There are no major long-term impacts associated with this project.

CONTENTS

Contents, continued

Contents, continued

Contents, continued

Contents, continued Page

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

AAD	Albuquerque Aviation Department
ABW	Air Base Wing
AC	Advisory circular
ACHP	Advisory Council on Historic Preservation
AFISC	Air Force Inspection and Safety Center
AFR	Air Force Regulation
AFSC	Air Force Systems Command
AIA	Albuquerque International Airport
AQCB	Air Quality Control Board
AQCR	Air quality control regulation
ASNA	Aviation safety and noise abatement
CCTW	Combat Crew Training Wing
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERL	Construction Engineering Research Laboratory
CO	Carbon monoxide
CUD	Compatible use districts
dB	Decibels
dB(A)	Decibels (A-weighted)
DEEV	Directorate of Engineering, Construction, Development
DOD	Department of Defense
DOE	Department of Energy
EA	Environmental assessment
EIAP	Environmental impact analysis process
EIS	Environmental impact statement
EPA	U.S. Environmental Protection Agency
EPNdB	Effective perceived noise level
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FHWA	Federal Highway Administration
FONSI	Finding of no significant impact
GA	General aviation
HC	Hydrocarbon
HUD	Housing and Urban Development
I-25	U.S. Interstate 25

I-40	U.S. Interstate 40
ICAO	International Civil Aviation Organization
IRP	Installation Restoration Program
JP-4	Aircraft fuel
KAFB	Kirtland Air Force Base
L_{dn}	Day and night noise levels
L_{eq}	Energy-equivalent sound level
LOS	Level of service
MAC	Military Airlift Command
mgd	Million gallons per day
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
mg/m^3	Milligrams per cubic meter
MSA	Metropolitan statistical area
N/A	Not applicable
NAAQS	National ambient air quality standards
NAC	Noise abatement criteria
NEPA	National Environmental Policy Act
NMANG	New Mexico Air National Guard
NMEID	New Mexico Environmental Improvements Department
NMFS	U.S. National Marine Fisheries Service
NO_2	Nitrogen dioxide
NOI	Notification of intent
NO_x	Nitrous oxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	Ozone
PCB	Polychlorinated biphenyls
PM_{10}	Particulate matter smaller than 10 microns
POL	Petroleum, oil, and lubricant
QD	Quantity distance
RCP	Reinforced concrete pipe
RCRA	Resource Conservation and Recovery Act
SEL	Sound exposure levels
SHPO	State historic preservation officer
SO_2	Sulfur dioxide
SWMU	Solid waste management unit
TSP	Total suspended particulates
$\mu g/m^3$	Micrograms per cubic meter
USAF	United States Air Force
USFWS	U.S. Fish and Wildlife Service

SECTION 1

PURPOSE AND NEED FOR THE ACTION

1.1 BACKGROUND

The Albuquerque International Airport (AIA) is located in Bernalillo County in central New Mexico, about 1½ miles east of U.S. Interstate 25 (I-25) and 1¾ miles south of I-40, at the foot of the Manzano Mountains. The airport, constructed in 1955, is a major airport in the southwestern United States. Kirtland Air Force Base (KAFB) is located adjacent to the airport. The general vicinity of KAFB and AIA is shown on figure 1.1-1. The location of KAFB is shown on figure 1.1-2.

The AIA is a joint-use facility owned by the City of Albuquerque and also serving KAFB and its related activities. The airport owns the runways and most taxiways, while the Air Force owns some taxiways. The east two-thirds of Runway 8-26 and its parallel taxiway on the north side, Taxiway A, are surrounded by the KAFB Military Reservation. The Air Force owns Taxiway E and the area east and south of the taxiway. Kirtland AFB is host to the following tenants which are either located along Taxiways A and E or must have access to the taxiways: the 1550th Combat Crew Training Wing (CCTW, helicopter flight training); 1606th Air Base Wing (ABW) Base Operations; New Mexico Air National Guard (NMANG) 150th Tactical Fighter Group; Naval Weapons Evaluation Facility; the Federal Aviation Administration (FAA) Control Tower; Air Force Systems Command (AFSC) Phillips Laboratory; Ross Aviation; Department of Energy's (DOE) Albuquerque Operations Office; and Sandia National Laboratories.

To adequately serve commercial and military aircraft needs, AIA must upgrade taxiways that service the major runway, 8-26. Runway 8-26 is located on an east-west axis. Runway 17-35 is on a north-south axis and is used only when Runway 8-26 is closed for maintenance or to accommodate changing wind directions. Aircraft using Runway 17-35 must fly over highly populated areas of Albuquerque. Proposed improvements along Runway 8-26 include widening and extending taxiways onto Air Force property. The AIA is requesting the Air Force grant a 20-year lease for approximately 70 acres of Air Force property needed for taxiway improvements.

1.2 PURPOSE AND NEED

Runway 8-26 is AIA's primary runway and is critical for the operation of the airport. The runway is near operational capacity due to limitations of current taxiways. The purpose of widening, extending, and constructing high-speed exits on Taxiways A and E is to improve aircraft access to and from Runway 8-26.

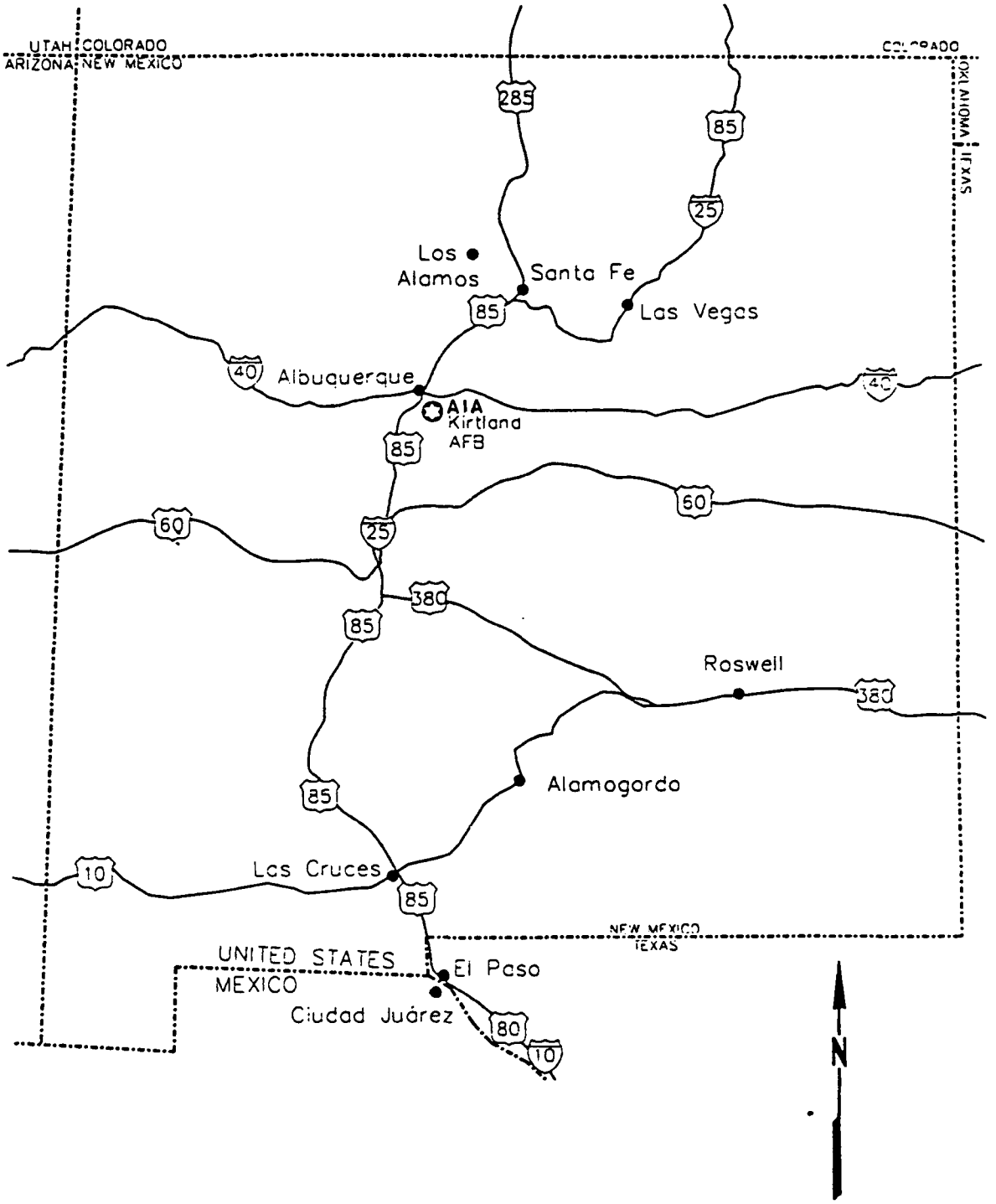


FIGURE 1.1-1
REGIONAL LOCATION MAP

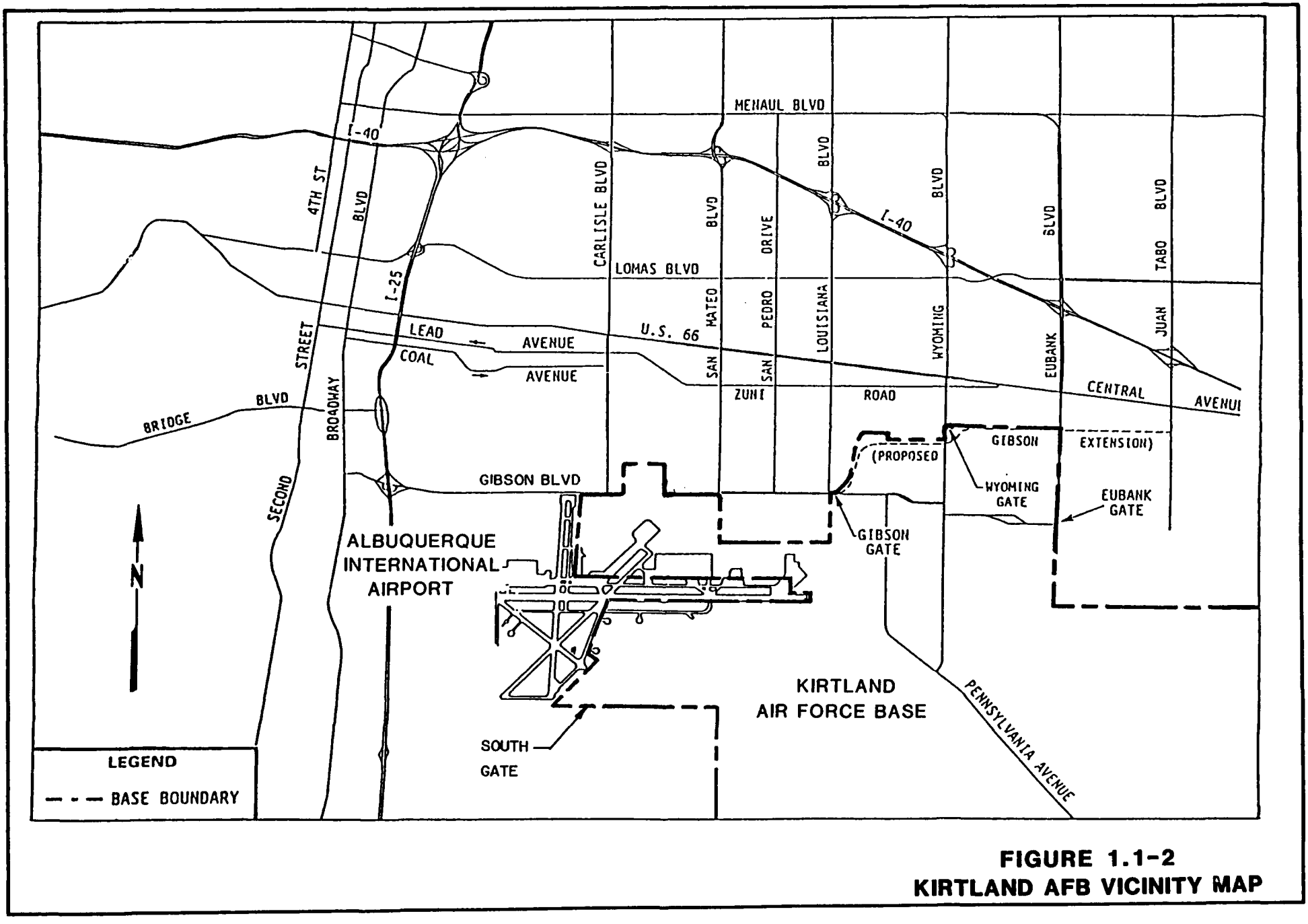


FIGURE 1.1-2
KIRTLAND AFB VICINITY MAP

Taxiway A provides the only access to Runway 8-26 from both the commercial air terminal facilities on the west side of the airport and the military facilities on the north side of the runway. Taxiway A's existing 35-year-old concrete and asphalt pavement does not meet current FAA carrier taxiway criteria with respect to width and load-carrying capacity. Some sections of the asphalt pavement soften during hot weather, and aircraft wheels can sink if they are not moving.

Taxiway E is currently used primarily by the NMANG to taxi their aircraft to the arm-dearm pad located at the east end of Taxiway E. Taxiway E's existing pavement and length are insufficient for use by commercial aircraft. Widening, repaving, and extending Taxiway E will enable commercial aircraft to use this taxiway, thus increasing the efficiency of Runway 8-26. Extending Taxiway E will also allow NMANG easier access to facilities associated with their operations. Taxiway E is also used by Sandia National Laboratories. The extension of Taxiway E will allow them to access their facilities southeast of Runway 8-26 without having to cross the runway to taxi east on Taxiway A.

Taxiways A and E's safety areas are not properly graded for drainage, and drainage systems are inadequate or nonexistent. The taxiway lighting does not meet current FAA standards. Also, since no records or drawings are available, the configuration of wiring connections in some sections of the taxiways is not known.

The purpose of constructing Taxiway AA is to provide two-way access in Taxiway A's heaviest traffic area, to increase aircraft takeoff and landing efficiency, and to enhance safety. It is desirable to have full-length parallel carrier taxiways on either side of the runway so that general aviation, commuter, and air cargo planes can arrive and depart without taxiing across the runway. Airport facilities for these activities are already located on the south side of the airfield or are in the process of being transferred there to make room for the projected increase in passenger traffic through the main terminal area. Since Taxiway A carries the most traffic, the Control Tower has a very difficult time managing landings when there is opposing traffic on Taxiway A, especially when Runway 8-26 is the active runway.

SECTION 2

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Albuquerque Aviation Department (AAD) proposes to remove the existing light-duty Taxiway E pavement and reconstruct the taxiway along Runway 8-26 to Hot Pad 5. Upon completion of Taxiway E, traffic would be routed over the new Taxiway E while the existing Taxiway A was being removed and similarly reconstructed. Finally, the AAD proposes to construct Taxiway AA as a two-way facility through Apron A. Other proposed work consists of drainage and lighting improvements along Taxiways A, AA, and E. The area of Air Force property to be leased for construction of the taxiways is shown in figure 2.1-1.

2.2 PROJECT DESCRIPTION

To meet current Federal Aviation Administration (FAA) requirements for group IV design criteria, the City of Albuquerque and the AAD propose to remove the existing light-duty pavement on Taxiway E and construct a new full-length parallel taxiway in its place with high-speed exits and other connecting taxiways. Drainage systems and airfield lighting would also be upgraded to meet FAA design requirements. On completion, the traffic which would normally travel on Taxiway A would be temporarily routed to the new Taxiway E, and Taxiway A would be reconstructed to meet group V design criteria. The AAD proposes to reconstruct Taxiway AA as a two-way facility extending east from Apron A to Apron E.

Construction of Taxiway E is scheduled to begin about January 1992 and continue for up to 18 months. This may entail closing Runway 8-26 for periods totaling 4 months. When Runway 8-26 is closed, all major commercial and military aircraft must use Runway 17-35. Runway 17-35 is about 3,000 feet shorter than Runway 8-26 and is on a north-south axis. When aircraft take off or land on this runway (usually to accommodate changing wind directions or runway maintenance) for any length of time, local residents complain about noise because the aircraft must fly directly over populated areas of the city.

Construction of Taxiway AA would necessitate relocating Base Operations facilities and vehicular and aircraft parking. The base real estate records indicate that these facilities include 15,143 square feet for operations offices, 29,507 square feet for headquarters maintenance, and 1,575 square feet for the snack bar. Several sites for Base Operations are being considered by KAFB. These locations are shown on figure 2.2-1. The preferred alternative is to occupy Hangar 1002 (Naval

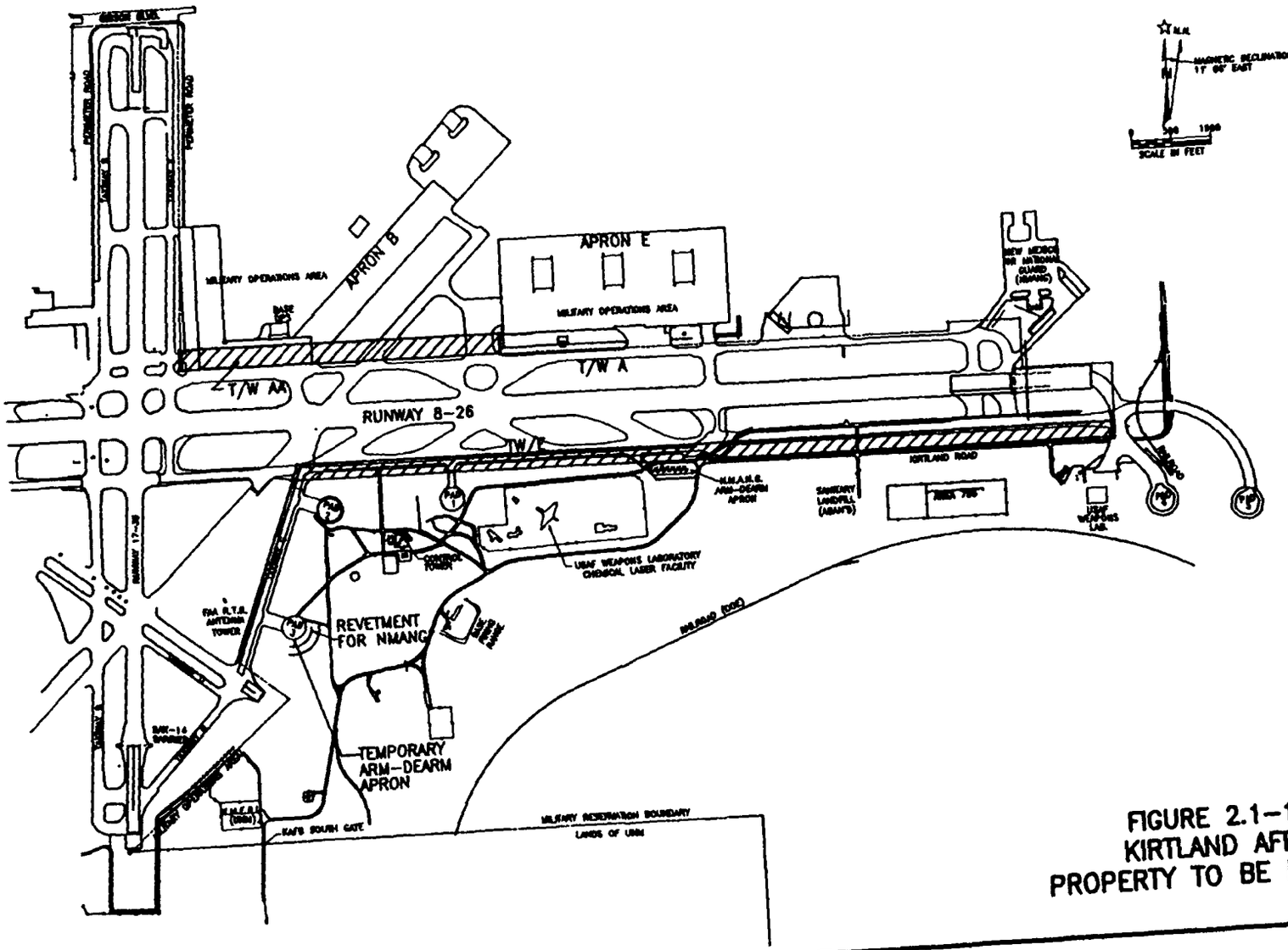


FIGURE 2.1-1
KIRTLAND AFB
PROPERTY TO BE LEASED

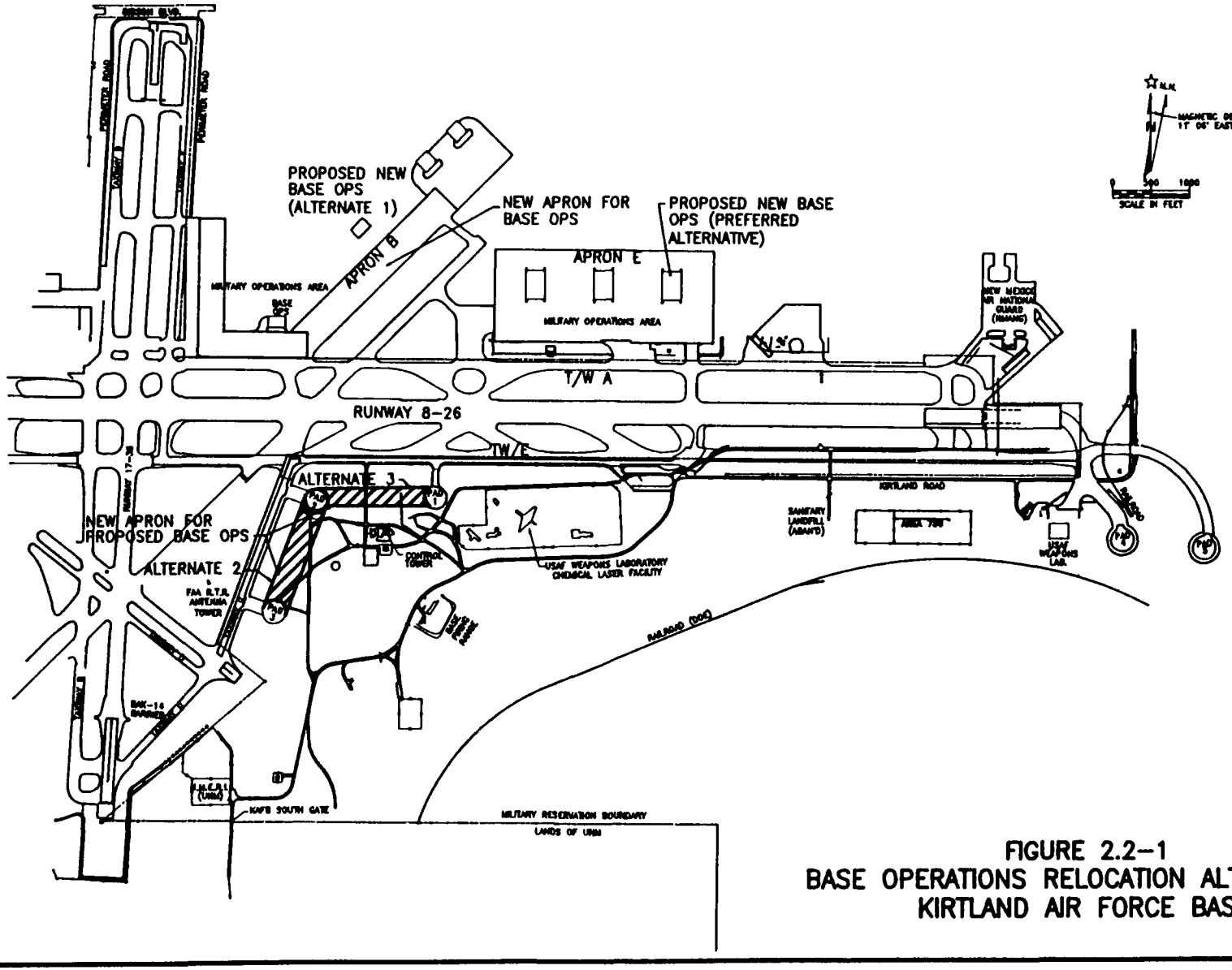


FIGURE 2.2-1
BASE OPERATIONS RELOCATION ALTERNATIVES
KIRTLAND AIR FORCE BASE

Weapons Evaluation Facility) which is located north of Taxiway A and west of the NMANG (Badgett, 1991a). The first alternative is to construct a new office facility adjacent to Apron B, use a portion of the existing apron for Base Operations aircraft parking, and construct a new concrete apron for the parking area because the existing apron is in poor condition. The second alternative is to construct an apron between Hot Pads 2 and 3 and use the existing office building at the Control Tower. A new control tower is currently being constructed and should be operable in about 2 years. The third alternative is to construct an apron between Hot Pads 1 and 2 and, as in the second alternative, use the existing office building at the Control Tower.

The project would also require temporarily relocating to Hot Pad 3 the NMANG's arm-dearm pad and projectile barrier. The existing facility is located at the east end of Taxiway E. A permanent apron and barrier would be constructed near its current location after the extension of Taxiway E was completed.

The proposed drainage improvements would increase capacity of the storm drainage system adjacent to the control tower from 140 cfs to a peak of 431 cfs. A retention basin would also be built at the end of the drainage system to assure that the stormwater discharge rate to the arroyo would not exceed the current discharge rate.

2.3 ALTERNATIVES TO THE PROPOSED ACTION

2.3.1 No-Action Alternative

If the improvements to Taxiways A and E were not implemented as planned, the result will be increased congestion and delays at AIA. Sudden failure of taxiway pavement is possible and could result in extensive damages to heavy aircraft and injuries to people.

Maintenance of the pavement on Taxiway A is a short-term solution since the pavement is too narrow and light to meet FAA criteria and the traffic continues to increase. In addition, drainage would remain inadequate and taxiway lighting would still not meet FAA standards. This alternative does not meet current mission requirements for either civilian or military air traffic, and its implementation would not alleviate further pavement deterioration from the anticipated increase in traffic on Taxiway A. The environmental consequences of this alternative are described in section 3, "Affected Environment."

2.3.2 Alternatives Eliminated from Consideration

Two alternatives were considered and eliminated:

Omit or defer Taxiway E and divert traffic to Runway 17-35. The extension of Taxiway E could be deferred or omitted, and traffic could be diverted to Runway 17-35 while Taxiway A is being reconstructed. Although this alternative would be less costly than the proposed action, it does not address the need for having dual parallel taxiways with high-speed exits to relieve congestion, avoid runway crossovers, and allow more efficient use of Runway 8-26. This alternative would require military aircraft to detour either down Runway 8-26 or by circuitous routes

through the base aprons while Taxiway A is closed. Extended use of Runway 17-35 would generate strong community opposition to increased noise levels over populated areas of the city. Finally, this runway is too short to adequately serve the needs of military and commercial airlines during the summer months.

Omit or defer Taxiway E and construct a new parallel taxiway north of Taxiway A. This alternative calls for reconstruction of Taxiway A after completion of a new parallel taxiway to the north. The same amount of land would be required as the proposed action; however, much of the land is occupied, requiring extensive relocation of military facilities. A new taxiway north of Taxiway A would also be adjacent to military activities, causing constant disruption to operations. This alternative does not address the need to serve civilian terminal facilities south of Runway 8-26, and its use would be limited if Taxiway A were closed due to accidents or construction activities. Taxiway E and its connecting taxiways will still be needed at some point in the future, and the city would then be compelled to acquire the land east of Taxiway E for construction.

2.4 SCOPE OF THIS ENVIRONMENTAL REVIEW

This document, the Environmental Assessment (EA), is part of the Environmental Impact Analysis Process (EIAP) for the proposed project. The EIAP is set forth in Air Force Regulation (AFR) 19-2, which implements the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) regulations, and U.S. Department of Defense (DOD) Directive 6050.1, 30 July 1979. This EA will identify, describe, and evaluate the potential environmental impacts on Air Force land use, operations (including government tenants), and environmental parameters (air quality, noise, water resources, biological resources, cultural resources, socioeconomics, transportation, and environmental management) associated with the operations and construction detailed by the proposed action along Taxiways A, AA, and E. This EA will also identify and evaluate impacts associated with relocating Base Operations at each of the four alternative sites.

All applicable program and environmental data necessary to analyze and document the environmental consequences of the proposed action will be collected. The environmental analysis process will provide the necessary data for the Air Force to determine if the proposed action qualifies for a "finding of no significant impact" (FONSI).

As appropriate, the affected environment and environmental consequences of the action may be described in terms of a regional overview (i.e., Bernalillo County and the City of Albuquerque) or a site-specific description (Taxiways A, AA, and E). Cumulative environmental effects will also be evaluated. Finally, the EA will identify environmental permits and mitigation measures required to prevent or minimize significant environmental effects.

The EA also considers the impacts of the federal storm water regulations promulgated 16 November 1990. These regulations require that construction permits be obtained for the proposed work as well as permits for discharges to the

arroyo adjacent to the Control Tower. Upgrading the taxiways and drainage system would increase flows such that the arroyo would require a retention basin to decrease the discharge rate of storm water to inhibit further erosion of the drainage channel.

The Air Force will use the EA to decide whether to lease to the City of Albuquerque the land required for construction of the proposed Taxiways E and AA, thus allowing the project to proceed. The decision will be made by the Deputy Assistant Secretary of the Air Force for Installations.

SECTION 3

AFFECTED ENVIRONMENT

The baseline data presented in the following sections are equated with the likelihood of potential impacts. Environmental components considered for this project are mission and operations; aircraft operations; air quality; noise; water resources; biological resources; cultural resources; socioeconomics; transportation; and installation environmental management programs.

3.1 MISSION AND OPERATIONS

3.1.1 Location

Kirtland AFB is located in central New Mexico, adjacent to the southeastern city limits of Albuquerque (figure 1.1-2). U.S. Interstate 40 is 1 3/4 miles north of the base, and I-25 is 1½ miles west. Kirtland AFB is located just east of the Manzano Mountains, and its southern border is adjacent to the Isleta Pueblo Indian Reservation. Residential areas are located north of the base, and business and residential properties are located to the west. The westernmost portion of the base is adjacent to Albuquerque International Airport, and runway facilities are used jointly by the base and the airport. Kirtland AFB covers an area of approximately 52,681 acres; the Air Force controls 44,017 acres (25,497 acres are fee-owned, 18,439 acres are withdrawn public domain lands, and 82 acres are easement); the DOE controls 7,522 acres (2,927 acres are fee-owned, and 4,595 acres are withdrawn public domain lands); and the City of Albuquerque owns 1,141 acres, including 1,110 acres of runways and taxiways (USAF, 1991b).

3.1.2 History

Military activity began at the site, then called Kirtland Field, in 1939 with the leasing of 2,000 acres near the municipal airport for use in servicing transient military aircraft. By 1941, B-17 and B-18 combat crew training was underway, and during subsequent war years, training of bombardiers, glider pilots, and B-24 crewmen took place at Kirtland Field.

Los Alamos Laboratory, north of Albuquerque, was involved in developing the first nuclear weapons during the latter years of World War II. The need for extensive flight support and test facilities reasonably near Los Alamos became apparent, and in September 1945, some units of Los Alamos Laboratory were moved to Sandia Base, an Army Air Force training depot for aircraft mechanics just east of Kirtland Field. These units were the predecessors of Sandia Corporation, which was organized in 1949 and is now Sandia National Laboratories, the largest tenant unit on KAFB. The laboratory is operated by the DOE.

Kirtland and Sandia merged into one base in 1971, under control of the U.S. Air Force. A year later, the Air Force Contract Management Division moved to the base and, in 1976 it took over the responsibility of managing KAFB through a new support organization, the 4900th Air Base Wing.

The Aerospace Rescue and Recovery Service moved its 1550th Combat Crew Training and Test Wing to KAFB from Hill AFB, Utah, in 1976 and is now a major tenant. The unit's helicopter and fixed-wing training program brought regular flight operations to KAFB in addition to providing support for transient military aircraft.

On July 1, 1977, the 1606th ABW was created when the Military Airlift Command (MAC) took over responsibility for operating KAFB. The 1606th ABW is the base host wing, providing technical facilities, procurement, and logistic support for many research and development programs. More than 175 tenant units or facilities are located at KAFB. Major tenants at KAFB include Sandia National Laboratories, the Air Force Systems Command Phillips Laboratory, the Air Force Operational and Test Evaluation Center; the New Mexico Air National Guard; the Naval Weapons Evaluation Center; and the Interservice Nuclear Weapons School.

3.1.3 Current Mission and Operations

Kirtland AFB is the fifth largest Air Force base and the largest base in MAC. The 1606th ABW's mission is to supply medical care, housing, civil engineering, fire protection, administrative support, personnel services, legal assistance, transportation, security, law enforcement, pay, accounting, and funds management. The 1550th Combat Crew Training Wing operates the consolidated Air Force helicopter training school for all Air Force helicopter crew members in conjunction with a specialized training school. The wing also provides basic and advanced pararescue qualification training.

Other organizations at KAFB include the Defense Logistics Agency, the Air Force's acquisition contract management agency, and Phillips Laboratory under the command of Space Systems Division. Phillips Laboratory's mission is to conduct research and develop technology for space systems, ballistic missiles, geophysics, and directed energy systems for the Air Force.

The DOE's Albuquerque Operations Office and their prime contractor, Sandia National Laboratories, conduct research and development, testing, stockpile surveillance, and transportation of nuclear materials.

As a result of the closure of Norton AFB, California, the Air Force Inspection and Safety Center (AFISC) will be transferred to KAFB in the first quarter of fiscal year 1994. AFISC's mission is to assess the Air Force's fighting capability and resource management effectiveness. AFISC consists of four units, one of which is currently based at KAFB. The other three units will be moved to KAFB as part of the base realignment plan. This move will involve approximately 346 military and 38 civilian personnel.

Other actions expected to occur at KAFB are the transfer of eleven helicopters (seven H-53 and four PAA H-3) from KAFB for replacement with thirteen heli-

copters (four MH53J, four CH-53-A, and five MH-60G) and associated support equipment, and deactivation of three MC-103H aircraft.

3.1.4 Land Use

The land use area discussed here consists of the northwestern area of the base and the area east of Runway 17-35. This area includes Runway 8-26 and consists of aircraft operations and training, mobilization, and maintenance facilities which are located along the north side of Taxiway A. Areas along the south portion of Runway 8-26 and Taxiway E are used primarily for testing, research, and training. As previously discussed, the City of Albuquerque is requesting to lease a total of approximately 70 acres (23 acres near Taxiway A and 47 acres near Taxiway E) from the Air Force (Tuttle, 1991).

The Albuquerque International Airport is owned and operated by the City of Albuquerque and consists of four runways. The primary runway, 8-26, is 13,375 feet long and 300 feet wide. The next most utilized runway, 17-35, is 10,010 feet long and 150 feet wide. All scheduled MAC, NMANG, and commercial flights use these runways. The other two runways, 3-21 and 12-30, are used less frequently and by smaller aircraft. An auxiliary field used for military helicopter operations is located in the southwestern corner of KAFB.

The area south of Taxiway E and Kirtland Road consists mainly of open space. The area contains several explosive ordnance disposal facilities and an abandoned sanitary and industrial landfill (Landfill 1). The landfill and areas outside the explosive safety zones (usually between 750 and 1,250 feet) may be used during construction for laydown of equipment, parking, or asphalt batch plants. Authorization from the base Chief of Safety (1606 ABW/SE) will be required prior to use of these areas.

Tenant organizations along Taxiways A and E are Base Operations, the base photo lab, 1550th CCTW, Naval Weapons Evaluation Facility, NMANG, the Control Tower, and Phillips Laboratory. DOE's Albuquerque Operations Office and Sandia National Laboratories use Taxiway E to access Hot Pad 5, which is located southeast of Runway 8-26. Kirtland AFB has five hot pads located on the south side of Taxiway E. These pads are used for loading and unloading explosive materials carried by aircraft.

The Air Force is considering moving Base Operations from its existing location along Apron A. Four alternatives are being considered: an area adjacent to Apron B; the area adjacent to the Control Tower between Hot Pads 1 and 2; the area between Hot Pads 2 and 3; and at Hangar 1002 (Naval Weapons Evaluation Facility). Each of these locations will require some site modifications and construction work, except Hangar 1002. Hangar 1002 is being used by the Navy until December 1992, when they will leave KAFB (Tuttle, 1991). It is expected the hangar will require only minor remodeling (electrical components and equipment inside the structure) for use as Base Operations (Badgett, 1991a).

Apron B is currently being used to park smaller aircraft used by the Aero Club. DOE and Ross Aviation must taxi across Apron B to access the northeast end of the

apron. Apron B is in such poor condition that Base Operations does not allow heavier aircraft to park on it. The asphalt pavement will need to be replaced if Base Operations is relocated near this area.

The area just north of the Control Tower between Hot Pads 1 and 2 is flat, open-spaced land. A concrete apron will be constructed between these two hot pads if this alternative is selected for Base Operations. A 60-inch-diameter storm sewer empties into a drainage ditch that traverses the area where the concrete apron will be constructed. This drainage ditch receives storm water runoff from the central part of Runway 8-26 and the industrial and residential areas to the north of the runway. This storm sewer will be upgraded to a 96-inch-diameter storm sewer during the construction of Taxiway E.

Base Operations could be relocated to the area to the west of the Control Tower, which is also flat and open-spaced. It is adjacent to Taxiway G and is near the area formerly used by the fire department for aircraft firefighting training. This area is now being investigated under the Installation Restoration Program (IRP) and is considered to be a solid waste management unit (SWMU). A concrete apron will be constructed between Hot Pads 2 and 3 if this alternative is selected.

Base Operations could also be relocated to Hangar 1002, which is located on Apron E just north of Taxiway A. According to Base Operations personnel, this facility would require the least renovation of all the alternative sites being considered for Base Operations. The concrete apron (Apron E) required by Base Operations already exists, but needs repair. Resurfacing work is scheduled for fiscal year 1992.

3.2 AIRCRAFT OPERATIONS

3.2.1 Current Aircraft Operations

The Albuquerque International Airport is a major provider of air passenger services to the southwestern portion of the United States. The airport is served by eight major and two regional commercial airlines. Passenger traffic has increased about 7 percent from 1989 to 1990. The airport recently expanded the number of passenger gates from twenty-two to thirty-two. A substantial part of increased air traffic is due to the growth of air freight business in recent years.

The total number of aircraft operations at AIA is not expected to grow substantially since the airfield is near capacity to handle traffic. Most new general aviation traffic and some commuter traffic will use Double Eagle Airport and other local airports in the metropolitan area.

The mixture of aircraft using AIA facilities will change as the percentage of commercial air carrier operations increases, leading to a heavier demand on carrier runways and taxiways. There is also a trend for both the commercial carriers and the military to use larger and heavier aircraft. The repetitive heavy loads on facility pavement will therefore increase substantially over the next 20 years. The military, especially the research and development facilities, uses a large number of very fast

aircraft which require wider separation distances and other more comprehensive safety features than civilian aircraft (Molzen-Corbin, 1990).

In 1990, about 6,000 sorties (takeoffs and landings) were performed by transient military aircraft, accounting for approximately 50 percent of all military air traffic at KAFB. A significant number of operations also involve the A-7D aircraft, which is used by the Navy and the NMANG. Transient aircraft involving only the NMANG was about 12 percent (600 sorties out of a total of 5,102) (White, 1991).

The 1550th CCTW uses C-130 aircraft and military helicopters (UH-1, H-3, and H-53). The 150th Tactical Fighter Group of the NMANG uses A-7D and C-130 aircraft. The Navy (Naval Weapons Evaluation Facility, Hangar 1002) flies A-7D and F-18 aircraft. The U.S. Customs Service, the Civil Air Patrol, and the Aero Club fly smaller sized single- and twin-engine aircraft.

Table 3.2.1-1 summarizes current aircraft operations at AIA, including both commercial and military operations (AIA, 1989). Some flight activity occur at the AIA from 10 P.M. to 7 A.M. Some nighttime flights are made by civil aircraft, some by transient military aircraft, and some by C-130 aircraft. No nighttime flights are made by the A-7D (NMANG or Navy) or F-18 aircraft.

3.2.2 Runway and Taxiway Utilization

The term *operation* in the following discussion refers to either one departure or one landing. A takeoff or departure generally consists of engine startup, taxi-out, engine run-up, takeoff roll, and climb-out. A landing or approach comprises the approach, touchdown, landing roll, taxi-in, and engine shutdown.

A daily average of 502.5 daytime commercial and military flight operations occurred at AIA during the period September 1, 1988, to February 28, 1989 (USAF, 1990b). During the period January to October 1990, combined commercial and military flight operations averaged 632 per day (Molzen-Corbin, 1990). Airport traffic records for the month of January 1991 averaged 545 daily commercial and military flight operations. Military aircraft accounted for ninety operations during this period. About 70 percent of the military aircraft operations are on Runway 08, 20 percent on Runway 26, 5 percent on Runway 17, and 5 percent on Runway 35. Runway 8-26 is used about 90 percent of the time (63 percent for Runway 08; 27 percent for Runway 26) by larger commercial aircraft, and Runway 17-35 is used about 10 percent of the time (3 percent for Runway 17; 7 percent for Runway 35). Runway utilization is based primarily on wind directions for AIA and, secondarily, on noise abatement (USAF, 1990b). Figure 3.2.2-1 is a wind rose for the Albuquerque area.

Military helicopter flights currently depart from six pads located on the north side of Taxiway A and conduct training flights at the auxiliary field in the southwestern corner of KAFB.

Sandia National Laboratories uses Taxiway E approximately once a month to access the hot pads located near the Control Tower. Sandia's transport aircraft (C-141s and C-130s) also use Taxiway E to cross the safety area of Runway 26 to

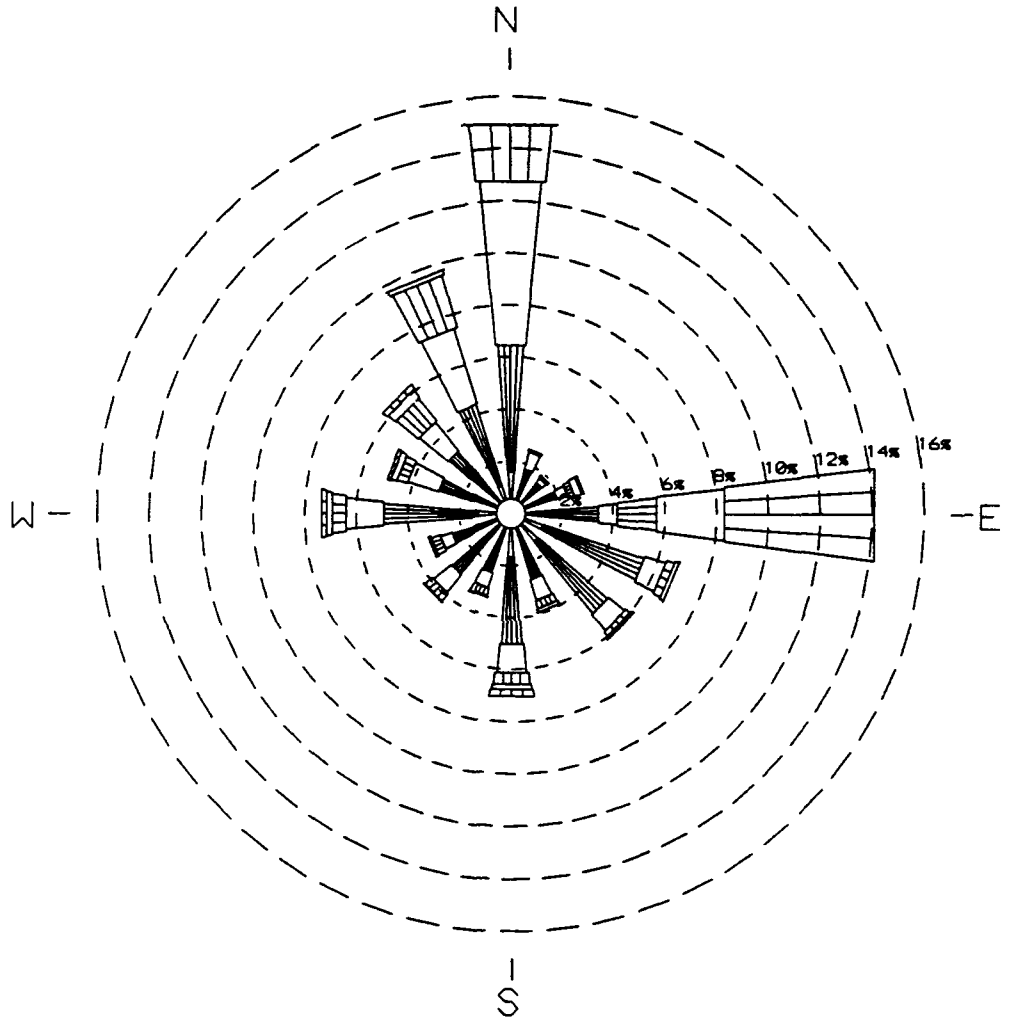
Table 3.2.1-1 Baseline Average Daily Aircraft Operations at Albuquerque International Airport

Aircraft	Takeoff		Landing		Total	
	Day	Night	Day	Night	Day	Night
DHC6	3.70	0.30	3.70	0.30	7.40	0.60
DHC7	4.70	0.40	4.69	0.40	9.39	0.80
CNA441	41.80	3.20	41.80	3.20	83.60	6.40
727Q9	22.40	1.60	22.29	1.71	44.69	3.31
737QN	40.90	3.10	40.90	3.09	81.80	6.19
737300	15.80	1.20	15.80	1.20	31.60	2.40
MD81	6.50	0.50	6.49	0.49	12.99	0.99
DC9Q9	1.90	0.10	1.89	0.09	3.79	0.19
L1010	0.90	0.00	0.89	0.09	1.79	0.09
KC135	1.00	0.00	1.00	0.00	2.00	0.00
C130	4.80	0.00	4.80	0.80	9.60	0.80
A7D	34.40	0.00	35.20	0.00	69.60	0.00
COMSEP[a]	75.10	6.30	75.10	6.31	150.20	12.61
BEC58P	25.02	2.10	25.02	2.11	50.04	4.21
COMJET[b]	4.20	0.41	4.20	0.39	8.40	0.80
TOTAL	283.12	19.21	283.77	20.18	566.89	39.39

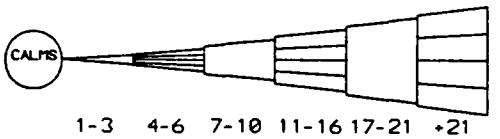
Source: AIA, 1989.

[a] COMSEP = Civil Air Patrol or Aero Club single-engine propeller aircraft.

[b] COMJET = Civil Air Patrol jet engine aircraft.



CALM WINDS 9.07%



1-3 4-6 7-10 11-16 17-21 +21

WIND SPEED CLASS
(KNOTS)

FIGURE 3.2.2-1
FREQUENCY OF WIND SPEED AND DIRECTION ALBUQUERQUE, NEW MEXICO

KIRTWIND

reach the DOE area at Hot Pad 5. The proposed project would allow the aircraft to taxi to the east end of the runway without crossing into the safety area. Other tenant organizations using Taxiway E are Ross Aviation and Phillips Laboratory. These organizations use Taxiway E very infrequently (less than once a month) (Kamhoot, 1991a).

3.2.3 Airspace Management

Airspace utilization is designed to achieve a measure of noise abatement for the surrounding area (USAF, 1990b). Present flight operations use Runway 8-26 approximately 90 percent of the time, with the remaining operations served by Runway 17-35. Runway 8-26 permits flight patterns along an east-west direction, avoiding much of the airspace over the City of Albuquerque.

3.2.4 Flight Safety

Kirtland AFB, like all United States Air Force (USAF) bases, conducts an extremely comprehensive flying safety program. Every aspect of flying and aircraft maintenance is governed by safety considerations to avoid the loss of life and property. Every precaution is taken to ensure the airworthiness of each aircraft, the flying proficiency of the aircrews, safe airborne operations, and ground safety.

No special flying safety requirements or procedures are needed at KAFB during normal base operations. However, construction work on several of the taxiways will require coordination between the Control Tower, Base Operations, base safety shop, and the construction contractor to maintain safe operations.

3.3 AIR QUALITY

Kirtland AFB and the Albuquerque metropolitan area are within New Mexico's Air Quality Control Region No. 2, one of eight regions in the state. Region 2 covers the northwestern portion of New Mexico and is contained within state boundaries. Air quality control functions for Bernalillo County have been delegated to the Albuquerque-Bernalillo County Air Quality Control Board (AQCB). Air quality management functions are carried out by the Albuquerque Department of Environmental Health, Air Pollution Control Division.

Air quality in a region is determined by comparing the ambient concentration of specific pollutants, usually in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$), with the appropriate federal or state ambient air quality standards. Ambient air quality standards are maximum limits or concentrations of pollutants in air. Federal standards are based on estimates of maximum concentrations which, with an allowance for safety, present no hazard to human health or the environment.

The Clean Air Act (CAA) provides the basis for regulating air pollution to the atmosphere. Different provisions of the CAA apply depending on where the source is located, which pollutants are being emitted, and in what amounts. The CAA required EPA to establish ambient ceilings for certain criteria pollutants. The ceilings were based on the latest scientific information regarding the effects a pollutant may have on public health or welfare. Subsequently, EPA promulgated regulations that set national ambient air quality standards (NAAQS).

Two classes of standards were established: primary and secondary. Primary standards define levels of air quality necessary to protect public health. Secondary standards define levels necessary to protect the environment (e.g., soils, vegetation and wildlife). NAAQS have been established for the following pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur dioxide (SO_2), lead, and particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}).

The CAA gives states the authority to establish air quality rules and regulations. The rules and regulations must be equivalent to or more stringent than the federal program. The State of New Mexico has adopted the federal standards, but has also established standards which are more stringent than some of the NAAQ. The state and federal primary and secondary air quality standards along with measured ambient pollutant concentrations near KAFB are presented in table 3.3-1.

An area is designated as being nonattainment for a particular pollutant if ambient concentrations in that area are above the corresponding standard. The Albuquerque Air Quality Control Region is classified as nonattainment for CO; however, the region has made steady progress toward achieving attainment status for CO in the last few years.

3.3.1 Meteorology and Climate

The Albuquerque area is dry and continental. Monthly mean temperatures range from 32.7°F in January to 78.7°F in July, with an average annual temperature of 56.8°F. Annual precipitation averages 8.4 inches and occurs primarily between June and September as brief and sometimes heavy thunderstorms. Snowfall occurs between December and March and averages approximately 10 inches annually. Relative humidity ranges from 16 to 69 percent.

The Albuquerque metropolitan area is situated in a river valley bounded by a high plateau on the west and a higher mountain range on the east. The valley is protected from passing storms and general (synoptic) wind flow patterns. The Sandia Mountains shelter the Albuquerque area from frigid winds that sweep down the plains from the east. However, this protection afforded by the mountains also reduces the ventilation of the area's air mass and leads to accumulation of pollutants in the ambient environment. The resulting accumulation of various pollutants creates unhealthy conditions during certain times of the year (USAF, 1990).

3.3.2 Existing Air Quality

There are eleven ambient air monitoring stations located within Bernalillo County. Air quality near KAFB is estimated from measurements made at air monitoring stations located near the base. The ambient levels shown in the last column of table 3.3-1 are from the closest monitors to the base, site 2ZN, located near the 6000 block of Anderson Street S.E., about 4,000 feet north of the base. Monitoring information from site 2ZM, located at 4700-A San Mateo N.E., was used for the TSP data in table 3.3-1.

The worst air quality problems occur in areas of high traffic density, such as major intersections and downtown Albuquerque. Carbon monoxide NAAQS viola

Table 3.3.-1. State and Federal Air Quality Standards and Ambient Values Near Kirtland AFB

Pollutant	State Standard	Federal Standard		Ambient Values[a]
		Primary	Secondary	
Carbon monoxide (mg/m^3)				
8-hour average	9.9	10	10	8.1[b]
1-hour average	15.0	40	40	14.9[b]
Nitrogen oxides ($\mu g/m^3$)				
24-hour average	200	–[c]	–	N/A[d]
Annual arithmetic mean	100	100	100	N/A
Ozone ($\mu g/m^3$)				
1-hour average	118	235	235	198[e]
Total suspended particulates ($\mu g/m^3$)				
24-hour average	150	260	150	112.0[b]
Annual geometric mean	60	75	60	50.7[b]
PM_{10} ($\mu g/m^3$)				
24-hour average	N/A	150	150	38.1[e]
Annual arithmetic mean	N/A	50	50	27.6[e]
Sulfur dioxide ($\mu g/m^3$)				
24-hour average	260	365	–	N/A
Annual arithmetic mean	53	80	–	N/A
3-hour average	–	–	1,300	N/A

[a] Best estimate of ambient values in Kirtland AFB vicinity.
[b] Monitoring station at 2421 Mesilla St. N.E., Albuquerque.
[c] No standard set.
[d] N/A = not available.
[e] Monitoring station at 6000 Anderson St. N.E., Albuquerque.
Source: USAF, 1990b.

tions generally occur in downtown Albuquerque because of the large volume of automobile emissions there. In Bernalillo County, the number of exceedances of the 8-hour CO standard has decreased in recent years. In 1983, the CO standard was exceeded on eighty-three occasions. In 1989, only one station near a busy intersection exceeded the standard. In 1990, the CO standard was exceeded on only three occasions; all three instances were recorded at the same air monitoring station. During the 1989-90 reporting period, ambient CO levels were reduced by 20 percent. The Albuquerque Vehicle Pollution Management Division predicts a similar reduction for the 1990-91 reporting period (USAF 1991b). Such a reduction would achieve attainment status in the area for all contaminants.

The dry climate in this part of New Mexico is also a contributor to air pollution with respect to fugitive dust. Dry conditions result in poor soil stabilization, thus increasing dust from fields, streets, roads, and construction zones. Each passing vehicle disturbs particles on roads and in construction zones, and causes reentrainment of particles into the air. Many of the particles are so small that they may take hours, or even days, to settle back to the ground.

An emissions inventory of Bernalillo County is presented in table 3.3.2-1. Total regional emissions are reported for PM_{10}, SO_2, NO_x, CO, and hydrocarbons (HC), broken down into the general types of emission sources.

Table 3.3.2-2 is an emissions inventory for KAFB. Primary emission sources are aircraft operations, motor vehicles, and firefighting training. Fuel evaporative losses from JP-4 (aircraft fuel) and gasoline and diesel storage, transfer, and use are major sources of HC emissions.

3.4 NOISE

3.4.1 Setting

The airport is situated close to the city, with major residential, commercial, and public properties to the north, east and west. Major landmarks to the east and south of the airport are Kirtland Air Force Base, the Cibola National Forest, and Isleta Indian Reservation. Noise-sensitive receptors are located on KAFB and in the surrounding area. On-base sensitive receptors are shown on figure 3.4.1-1.

The military also has a major helicopter training facility at this location. Training missions call for a considerable number of low-level flights to and from a helipad approximately 4 miles south-southwest of the airport. Helicopters use different air corridors than fixed-wing aircraft.

Figure 3.4.1-2 shows the 1988 baseline condition noise contours for military and commercial aircraft operations at AIA (AIA, 1989). Comparing the contours with the existing land use map prepared by the KAFB Planning Department reveals numerous sensitive receptors near and within an L_{dn} of 65 dB(A) or greater. These sensitive receptors include residential areas, schools, and hospitals located near the flight path. Review of radar flight tracks over KAFB under the 1988 baseline situation reveals no flight operations are directly over the on-base sensitive receptors. Table 3.4.1-1 shows existing noise levels for on-base sensitive receptors.

Table 3.3.2-1. Emissions Inventory for Bernalillo County, New Mexico, 1986

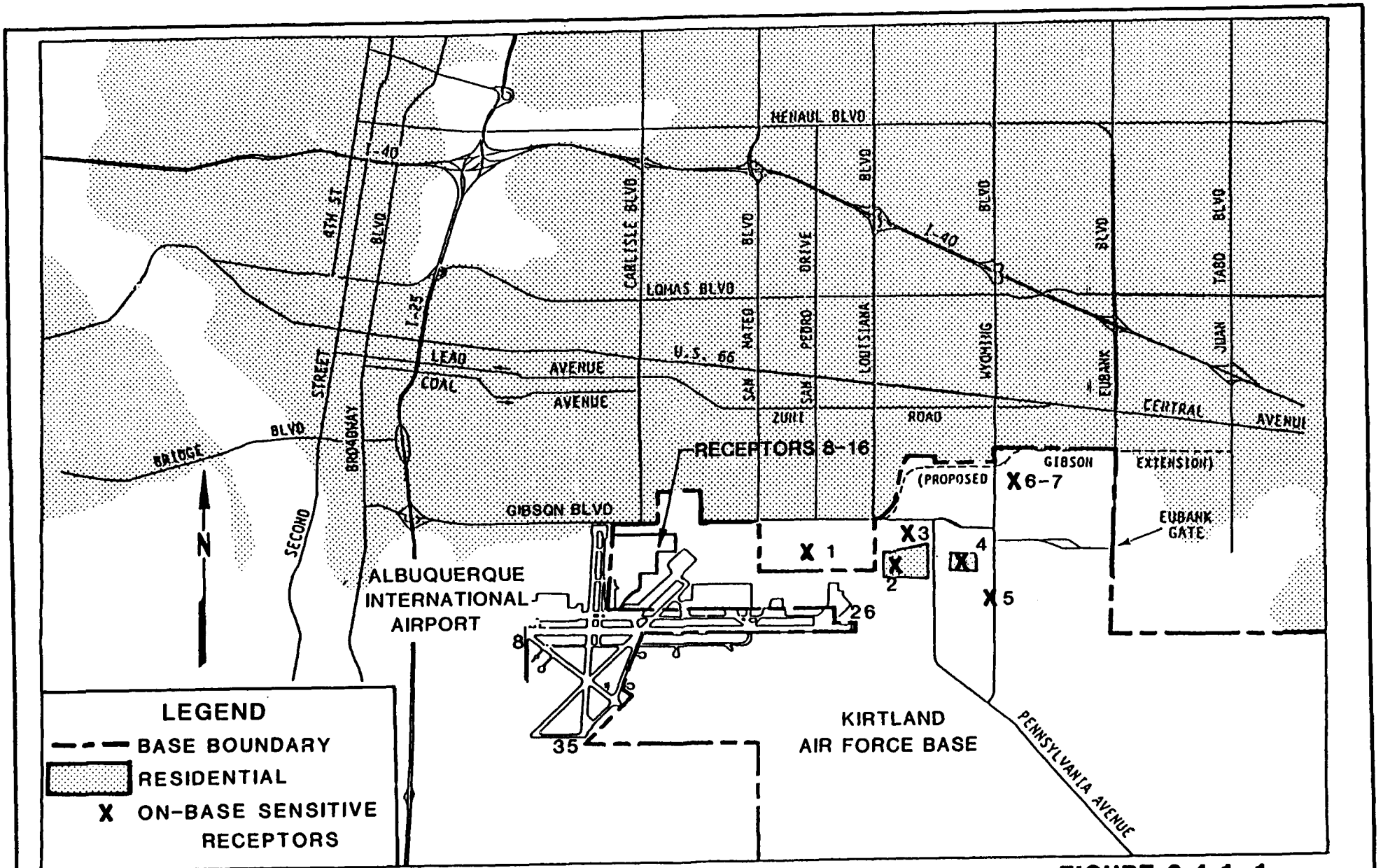
Source Category	Emissions (tons/year)				
	HC	CO	NO_x	SO_x	TSP
Transportation	19,258	174,608	12,860	245	2,564
Residential	1,151	8,180	747	20	1,120
Public roadway (dust)	–	–	–	–	38,315
Industrial	1,640	139	2,007	10	1,475
Commercial	–	65	327	2	16
Agricultural	–	–	–	–	13
Construction/development	–	–	–	–	17,281
Solid waste disposal	6	104	7	–	<1
Miscellaneous	99	328	19	3	63
Total	22,154	183,424	15,967	280	60,847

Source: USAF, 1991b.

Table 3.3.2-2. Emissions Inventory for Kirtland AFB, 1988

Source Category	Emissions (tons/year) HC	CO	NO_x	SO_x	Particulates
Transient alert aircraft	55.83	128.80	14.68	3.01	1.54
Assigned aircraft	132.87	180.26	35.59	4.21	1.76
Aerospace ground equipment	2.56	8.83	8.94	0.64	1.27
Firefighting training	16.61	25.44	0.20	0.02	0.59
Commercial heating plant	1.37	3.43	13.72	0.10	0.85
Domestic heating	1.37	3.43	13.72	0.10	0.85
Emergency power production	0.36	1.22	4.41	0.32	0.29
Military vehicles	17.86	166.09	17.76	0.72	2.36
Privately owned vehicles	255.13	2,371.79	253.56	10.24	33.70
Fuel spills	3.22	0.00	0.00	0.00	0.00
Fuel evaporation losses (gasoline and diesel)	25.25	0.00	0.00	0.00	0.00
Fuel evaporation losses (JP-4)	64.87	0.00	0.00	0.00	0.00
Total	576.54	2,887.60	358.54	24.10	42.88

Source: USAF, 1991b.



SOURCE: Department of Air Force

FIGURE 3.4.1-1
SENSITIVE RECEPTOR LOCATIONS
KIRTLAND AFB

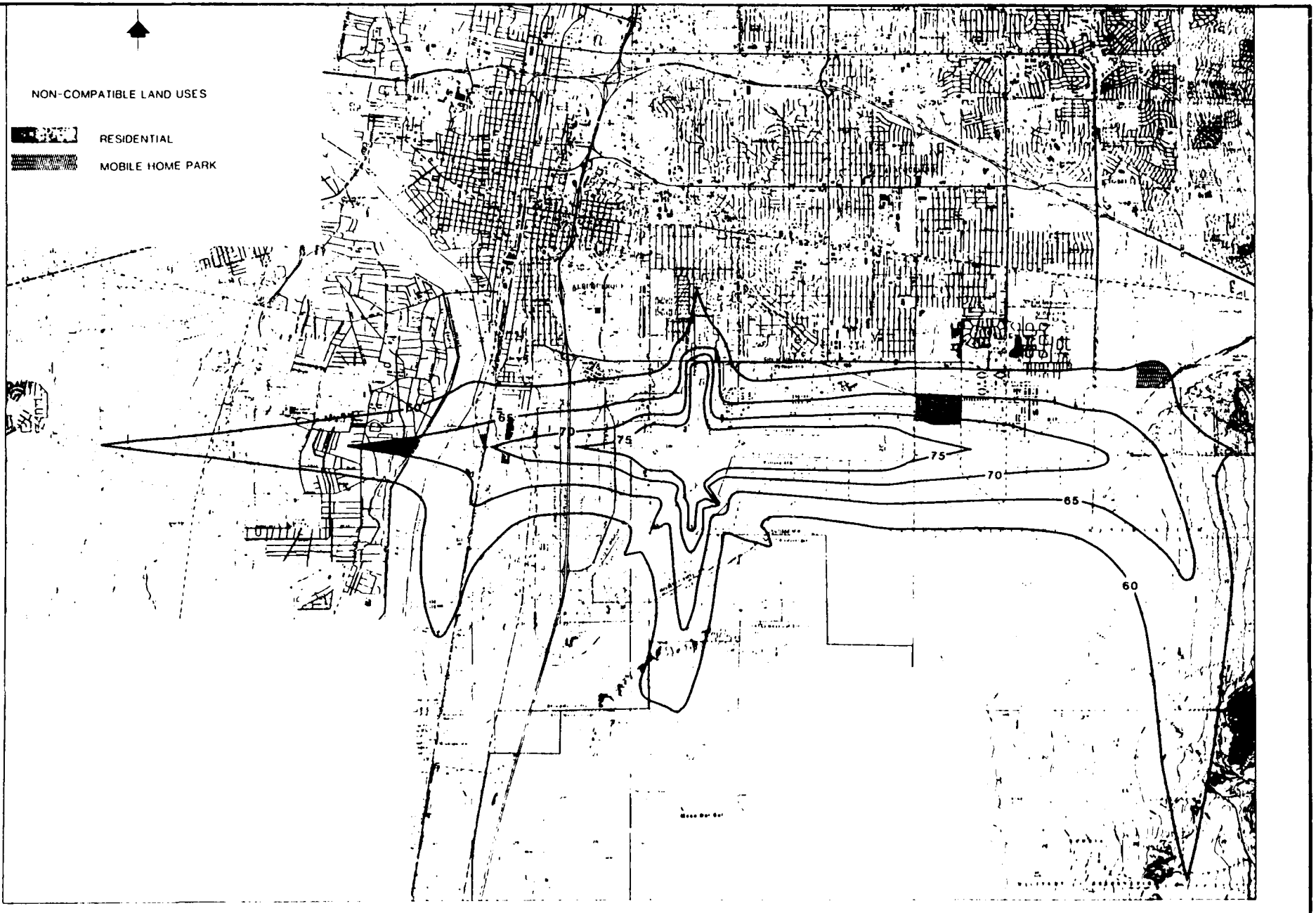


FIGURE 3.4.1-2 Ldn CONTOURS FOR ALL FLIGHT OPERATIONS UNDER THE 1988 BASELINE SITUATION SOURCE: AIA, 1989

Table 3.4.1-1 Kirtland AFB On-Base Sensitive Receptors for Existing Air Patterns

Sensitive Receptor	Estimated L_{dn}, dB(A)*
1. Veterans Administration Hospital	60
2. Family housing - Wherry Neighborhood	65
3. Public school	60
4. Dorms - military	65
5. Correction facility - military	70
6. Hospital	55
7. Chapel	55
8. Technical library	60
9. Family housing - enlisted personnel	60-65
10. Youth center	60
11. Public school	60
12. Guest housing	60
13. Church	55
14. Officers club	55
15. Dorms - military	55
16. Flight training	60

* L_{dn} = day and night loudness levels.
dB(A) = A-weighted decibels.
Source: AIA, 1989, and Kirtland AFB Land Use Map, 1982.

About 3,600 base personnel are estimated to fall within the 65 dB(A) L_{dn} contour under existing conditions.

Approximately 90 percent of commercial and military operations use Runway 8-26 and 10 percent use Runway 17-35. There are no large commercial or military aircraft using the other two runways. Table 3.4.1-2 shows the existing runway utilization at KAFB. During temporary closure of Runway 8-26, all larger commercial and military aircraft will use Runway 17-35.

3.4.2 Noise Terminology

Noise is most often defined as unwanted sound. Sound levels are easily measured, but the variability in subjective and physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation by subjective terms such as *loudness* or *noisiness*. Physically, sound-pressure magnitude is measured and quantified in terms of a logarithmic scale in units of decibels (dB).

The human hearing system is not equally sensitive to sound at all frequencies. Because of this variability, a frequency-dependent adjustment called A-weighting has been devised so that sound may be measured in a manner similar to the way the human hearing system responds. The use of the A-weighted sound level is abbreviated "dB(A)." Figure 3.4.2-1 depicts typical A-weighted noise levels measured for various sources and human responses to these levels.

When sound levels are recorded at distinct intervals over a period of time, they indicate the distribution of the overall sound level in a community during the measurement period. The most common parameter derived from such measurements is the energy-equivalent sound level (L_{eq}); this is a noise descriptor that represents the average sound-energy level produced when the actual noise level varies with time.

For airport noise, the FAA and the Air Force have adopted the day-night average sound level (L_{dn}). L_{dn} is the A-weighted L_{eq} over a 24-hour period, with a 10-dB nighttime penalty applied to noise events from 10:00 P.M. to 7:00 A.M. The penalty for nighttime noise events accounts for the increased sensitivity of most people to noise in the quiet nighttime hours. Developed by the EPA, L_{dn} is the metric for determining the cumulative exposure of individuals to noise. The U.S. Department of Housing and Urban Development (HUD) uses L_{dn} as the standard for measuring outdoor noise environments.

3.4.3 Significance Criteria

According to HUD, FAA, and Air Force criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds 75 L_{dn}, "normally unacceptable" in regions exposed to L_{dn} of 65 to 75 dB(A), and "normally acceptable" in areas exposed to an L_{dn} of 65 dB(A) or less.

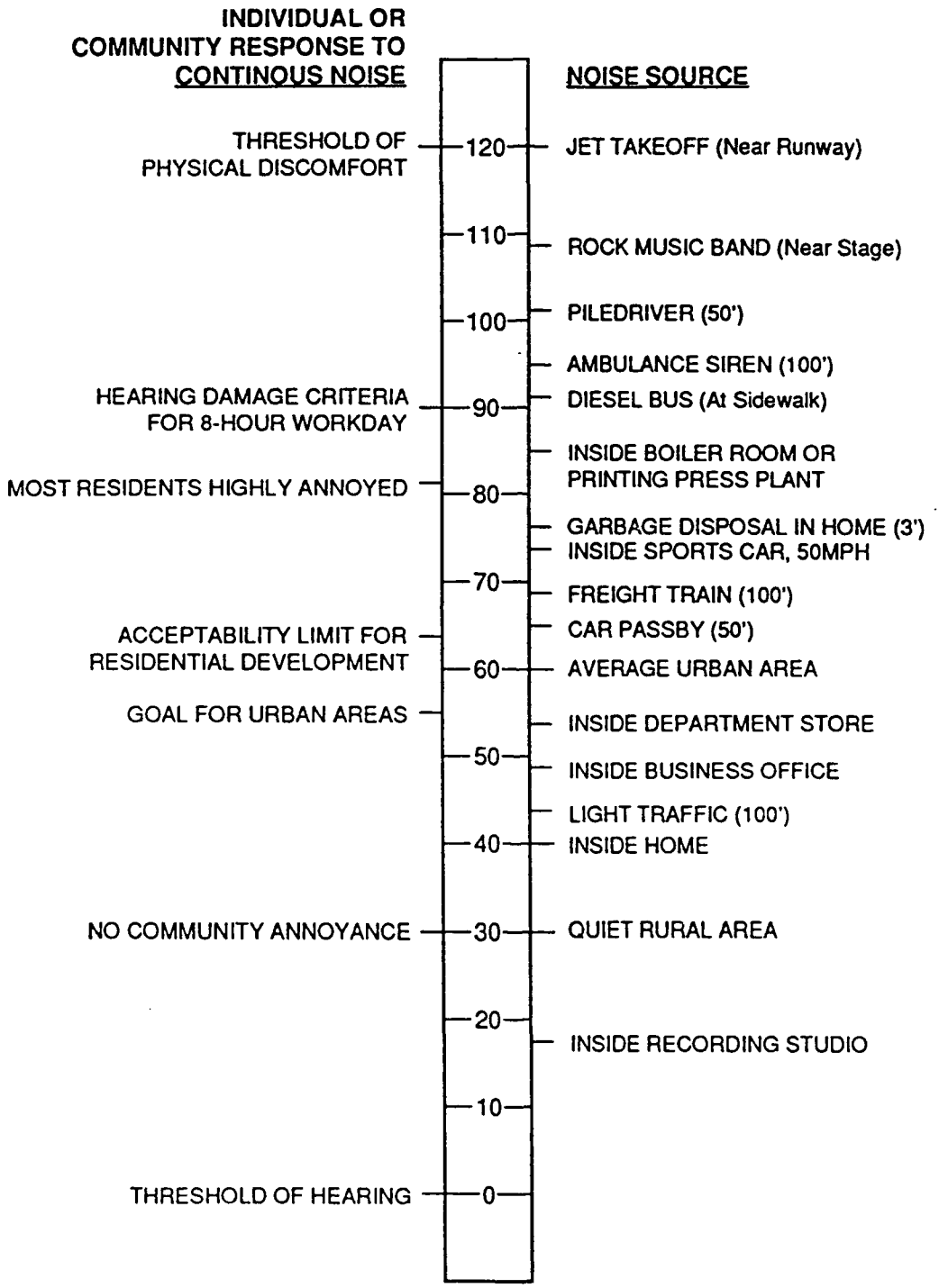
The following subsection briefly explains the noise policies of agencies having jurisdiction over this project.

Table 3.4.1-2 Existing Runway Utilization at Albuquerque International Airport

Aircraft Category/ Operation	Utilization (%) Runway 08	Runway 26	Runway 17	Runway 35	Runway 03	Runway 30	Runway 12	Runway 21
MAC scheduled[a] (C-130H)	70	20	5	5	0	0	0	0
ANG scheduled[a,b] (A-7D, C-130H)	70	20	5	5	0	0	0	0
Navy scheduled								
A-7D and F-18[a]	70	20	5	5	0	0	0	0
Piper and Cheyenne								
Landings	63	27	3	7	0	0	0	0
Departures	60	15	5	5	5	5	5	0
Transients[a]	70	20	5	5	0	0	0	0
Civil nonscheduled								
Landings	25	7	8	3	24	32	1	1
Departures	59	10	14	0	0	2	8	8
Civil scheduled								
Landings	63	27	3	7	0	0	0	0
Departures	64	27	7	3	0	0	0	0
Aero Club (COMSEP[c])								
Landings	25	7	8	3	24	32	1	0
Departures	82	13	0	3	0	0	0	2
Civil Air Patrol (COMSEP[c])								
Landings	25	7	8	3	24	32	1	0
Departures	100	0	0	0	0	0	0	0
Cutter Air								
Misc. military[a]	70	20	5	5	0	0	0	0
CNA441								
Landings	63	27	3	7	0	0	0	0
D. partures	70	20	5	5	0	0	0	0
U.S. Customs								
Miscellaneous military[a]	70	20	5	5	0	0	0	0
CNA500								
Landings	25	7	8	3	24	32	1	0
Departures	63	27	5	5	0	0	0	0
CNA441								
Landings	63	27	3	7	0	0	0	0
Departures	63	27	5	5	0	0	0	0

[a] Landings and departures.
[b] Existing and future (F-16s).
[c] COMSEP = single-engine propeller aircraft.
Source: USAF, 1990.

E5\AU27006\5T341-2



Source: Engineering-Science

Figure 3.4.2-1 Typical Sound Levels from Indoor and Outdoor Noise Sources and their Effect on People

Federal regulations: To aid the airport operator in attaining noise-land compatibility, the FAA promulgated Federal Aviation Regulation (FAR) part 150, "Airport Noise Compatibility Planning," which originally became effective on February 28, 1981, and was updated effective March 16, 1988. Part 150 contains standards for airport operators who voluntarily submit noise exposure maps and airport noise compatibility planning programs to the FAA. This regulation was based on Title I of the Aviation Safety and Noise Abatement Act (ASNA Act) of 1979, which adopted modified EPA recommendations for airport noise compatibility planning. Included in the regulation is establishment of a single system for determining the exposure of individuals to airport noise, and a single system for measuring airport (and background) noise. The regulation also prescribes a standard airport noise compatibility planning program, which calls for (1) development and submittal of noise exposure maps and noise compatibility programs to the FAA by airport operators; (2) standard noise methodologies and units for use in assessing airport noise; (3) identification of land uses that are normally compatible (or incompatible) with various levels of airport noise; and (4) the procedure and criteria for FAA evaluation, and approval or disapproval, of noise compatibility programs by the FAA administrator. The FAR part 150 "Noise Exposure Maps and Noise Compatibility Plan for the Albuquerque International Airport" is dated April 1989 (AIA, 1989).

FAR part 150 contains a table entitled "Land Use Compatibility with Yearly Day-Night Average Sound Levels," identifying land uses that are "normally compatible" or "noncompatible" with various levels of noise exposure. The levels of noise exposure, in yearly L_{dn}, correspond to the contours developed for the airport. All land uses may be considered normally compatible with an L_{dn} below 65 dB(A).

Air Force regulations: Land use recommendations for the Air Force are similar to the FAA regulations. Thirteen compatible use districts (CUD) are used to classify noise zones from an L_{dn} of 65 to 70 dB(A) (CUD 13) to an L_{dn} of 85 dB(A) and above (CUD 1). For example, it is recommended that no residential uses such as homes, multifamily dwellings, hotels, and mobile home parks be located where the noise levels are expected to exceed an L_{dn} of 65 dB(A). Some commercial and industrial uses are considered acceptable where the L_{dn} does not exceed L_{dn} 75 dB(A). However, in such instances a 25 to 30 dB noise level reduction should be incorporated into the design ofnoise sensitive structures.

Truck Noise Regulations: The Federal Highway Administration (FHWA) has established noise standards for traffic noise on federal highways. When these standards or noise abatement criteria (NAC) are approached or exceeded, noise impact occurs. The NAC for most sensitive receptors (including parks, residences, schools, churches, libraries and hospitals) is 67 dB(A) at the receptor location or the boundary (FHWA, 1982).

Construction Noise Regulations: The City of Albuquerque noise ordinance has noise limits for construction activities (Ordinance 21-1975). According to this ordinance, "It shall be unlawful for any person within a residential zone, or within a radius of 500 feet therefrom, to operate or cause to be operated, any equipment used in construction, repair, alteration or demolition work on buildings, structures,

streets, alleys or appurtenances thereto, with sound control devices less effective than those provided on the original equipment, or in violation of an regulations of the United States Environmental Protection Agency; or to operate or cause to be operated any such equipment during the nighttime, except in emergency situations as defined in Section 2 of this ordinance, in such a manner that the sound produced exceeds 50 dB(A), or 10 dB(A) above the ambient noise level, whichever is higher, when measured at the residential property line" (EHD, 1975).

The significance of increased noise levels is based on the ability of people to detect changes in their noise environment. If construction or operation of the proposed project is expected to cause an increase of 5 dB(A) or more, resulting in a residential receptor environment of 55 dB(A) or more, then the impact is considered significant. Where the ambient noise level is already 50 dB(A) or above, an increase of 5 dB(A) above the ambient would be significant. Levels 10 dB(A) higher than the ambient are illegal in Albuquerque (EHD, 1975).

Local land use noise regulations: The City of Albuquerque has adopted Ordinance 21-1975 "relating to the control of noise, by establishing noise levels, for the protection of public health and welfare and providing penalties." Known as the "Noise Control Ordinance," this document covers most items normally associated with noise and identifies types of land uses and the associated noise criteria. In general, "it is unlawful for any person to make or continue, cause to be made or continued, or allow to be made or continued any noise in excess of 50 dB(A), or 10 dB(A) above the ambient noise level, whichever is higher, at any residential property line." Aircraft engine noise during takeoff, landing, or ground aircraft movements is exempt (EHD, 1975).

3.4.4 Sleep Disturbance

The primary human response to environmental noise, including aircraft noise, is annoyance. The degree of annoyance has been found by EPA to correlate well with the L_{dn}. A comparison of L_{dn} with the percentage of the exposed population that are "highly annoyed" in combination with the estimated population exposed to L_{dn} levels greater than 65 dB(A) provides an estimate of the number of persons "highly annoyed" by aircraft noise. These levels of annoyance are based on long-term exposure. Annoyance for short term activities, such as construction noise and new flight patterns, could be influenced by factors such as habituation and attitude toward the activity creating the noise. None the less, a comparison of this type provides the best available information to predict reactions to a new noise exposure.

Sleep disturbance is a major factor in annoyance related to aircraft noise exposure. The Air Force has developed an empirical relationship between sound exposure levels (SEL) and the percent of exposed persons awakened and may be used to estimated the numbers of persons likely to be awakened by a single aircraft operation (Pearsons, 1989). This relationship between SEL and percent awakened was developed from field and laboratory measurements. With a significant variations in the SEL values for single events, the estimates of the number of persons awakened by individual operations are most useful for comparing the effects of various types of operations rather than predicting the impact of specific events. Operations impacts

related to sleep disturbance, SEL, and percent of exposed persons awakened is discussed in section 4.4.2. Figure 3.4.4-1 presents sleep disturbance, defined as percent awakened, plotted against a specific noise level in decibels. Figure 3.4.4-1 shows that an indoor SEL of approximately 110 dB will result in 100 percent awakenings. An indoor level of 65 dB results in nearly 20 percent awakenings. The average percent awakened is affected significantly by improving the sound attenuation characteristics of the building.

3.5 WATER RESOURCES

3.5.1 Surface Water

The flat mesa on which KAFB and AIA are located drains to the Rio Grande River through the Tijeras Arroyo. Precipitation runs as overland flow from the airport site and adjacent military installations to a series of drains, flood canals, and unnamed small arroyos which lead the storm water south to where the Tijeras Arroyo crosses the northwest corner of KAFB and flows south of the airport installations through a steep canyon.

Flooding occurs infrequently in the KAFB area. Localized flooding does occur during summer months, when nearly half of the 8.4 inches of mean annual precipitation is received in the form of brief, intense thunderstorms. Nearly 95 percent of the precipitation in the area is lost by evaporation. The remaining precipitation is divided nearly equally between runoff and groundwater recharge (COE, 1979).

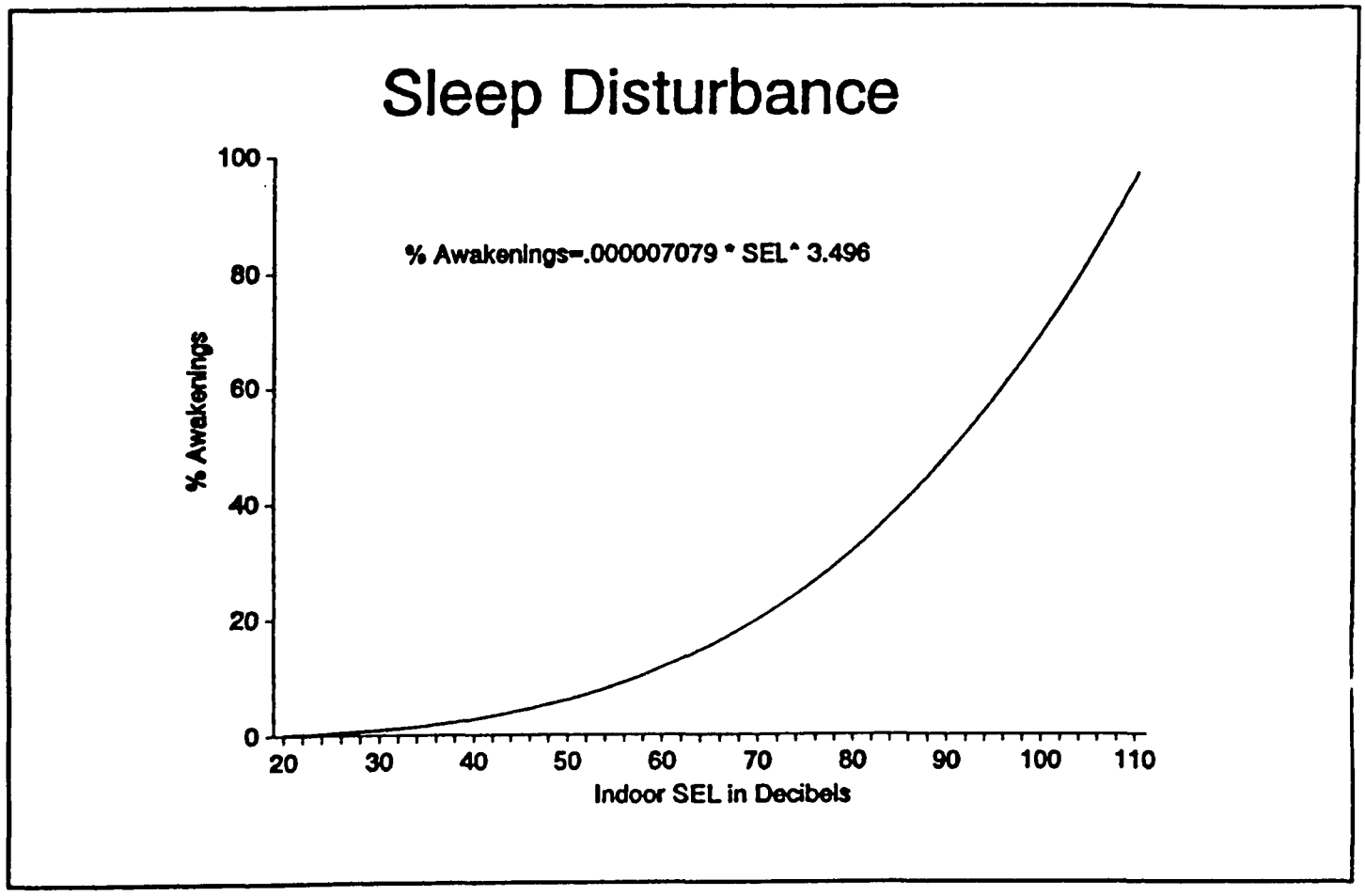
3.5.1.1 Drainage

According to a recent review of the KAFB drainage infrastructure (Molzen, Corbin, 1990), there is no overall drainage management plan for the airport-KAFB complex. Several storm drains, particularly in Runway 8-26, were built along new airport facilities without resizing the original outflow lines for increased runoff. Inadequate storm water facilities and poor grading of the taxiways, along with the resulting ponding, have lead to water saturation in the subgrade and pavement failure.

Of three main storm drain systems identified by the Molzen-Corbin report as having inadequate capacity, two are of concern for the taxiways improvement project:

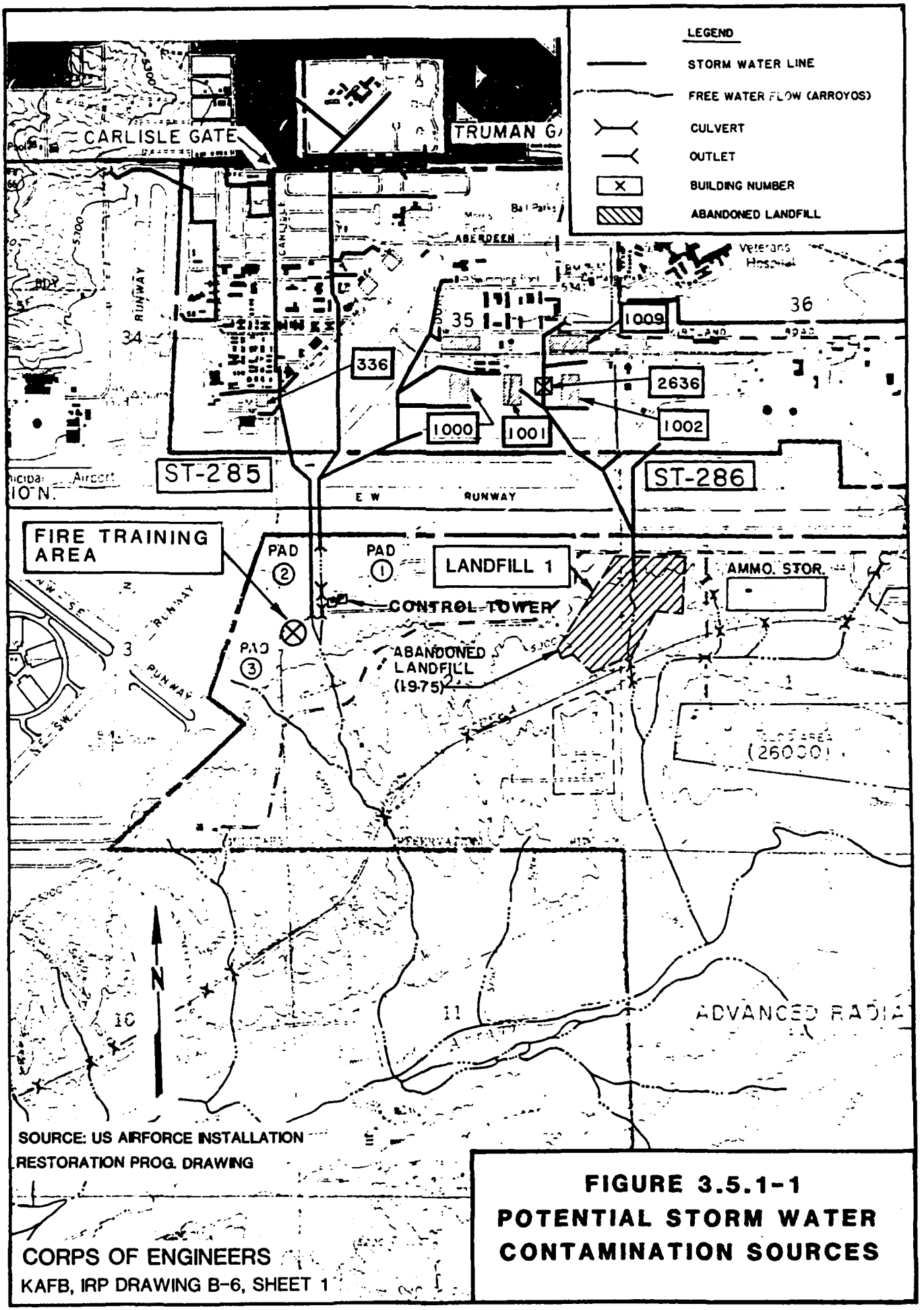
- The Landfill 1 drain system collects runoff from Apron E and surrounding military operations areas located north of Runway 8-26 and becomes the dividing mark between the east and west sections of the abandoned landfill.
- The Control Tower drain system consists of three discharge lines receiving storm water from a drain basin which encompasses approximately 600 acres of the central area of Runway 8-26 and upstream housing and military installations.

These two drain systems are identified in KAFB Installation Restoration Program report drawings as storm sewer systems ST-286 and ST-285, respectively (figure 3.5.1-1).



SOURCE: PEARSONS, 1989

FIGURE 3.4.4-1 SLEEP DISTURBANCE AS A FUNCTION OF INDOOR SEL



SOURCE: US AIRFORCE INSTALLATION RESTORATION PROG. DRAWING

CORPS OF ENGINEERS
KAFB, IRP DRAWING B-6, SHEET 1

FIGURE 3.5.1-1
POTENTIAL STORM WATER CONTAMINATION SOURCES

Landfill 1 Drain System

Precipitation from the Landfill 1 drain system is collected by a single 42-inch-diameter reinforced concrete pipe (RCP) discharge line which runs north to south, across Runway 8-26 and associated taxiways. The collected storm water is discharged to a small receiving arroyo south of Runway 8-26, through a culvert under the Kirtland Road embankment. The upstream section of the arroyo bisects Landfill 1, which contains primarily sanitary waste (east side) and construction waste (west side).

A substantial erosion problem occurs downstream from the culvert under Kirtland Road, where the arroyo has gradually eroded the east side of the landfill. The KAFB DEEV Office has proposed lining the arroyo adjacent to the landfill to reduce the potential of storm water contamination and to inhibit further erosion of the arroyo. Analysis of the arroyo's water quality is currently under way as part of the KAFB Installation Restoration Program (USAF, 1991a).

Control Tower Drain System

Most of the storm water from the Control Tower drain system is collected by a 60-inch drain which crosses the airport site from north to south and opens into a 1,400-foot ditch originating north of the airport Control Tower. The remaining runoff is collected by two buried 24-inch drain lines which run parallel to the 60-inch line and extend to the end of the discharge ditch. The ditch is lined with brush and trees and is partially blocked by waste construction material.

The outlets of the discharge ditch and the twin 24-inch lines open to a 15-foot drop at the south rim of the airport mesa. This runoff is received by a small arroyo which meanders south through a relatively flat terrain selected as the construction site for the proposed retention basin. Storm water from the arroyo is routed by a series of low levees to a culvert under the Kirtland Road embankment. Downstream of Kirtland Road, the arroyo opens into a sand bed, 50 to 150 feet wide, which extends for approximately 2,000 feet to a railroad berm. An extensive sand deposit has formed along the berm due to impoundment of runoff and has partially obstructed two existing 48-inch-diameter culverts. The arroyo continues south of the railroad berm, through University of New Mexico land, and joins the Tijeras Arroyo, following a path rerouted by a levee around the city's Montessa Park farm.

Erosional problems are found in two areas of the Control Tower drain system: the outlet end of the discharge ditch, and the upstream section of the arroyo at the culvert under Kirtland Road.

At the rim of the mesa, the drop in elevation of the ditch outlet has caused runoff to erode the supporting embankment, thus displacing large sections of the riprap armour covering the ditch outlet. This erosion process has also destabilized the embankment and the headwall of the twin 24-inch drain lines.

The Kirtland Road embankment is being eroded around the culvert inlet. The embankment has been stabilized with concrete slabs around the culvert outlet, but a few feet downstream, the arroyo has carved multiple deep gullies. As a result of this process, the arroyo bed is getting wider as silt builds up from upstream headcutting.

3.5.1.2 Water Quality

Industrial shops located along Taxiway A formerly disposed of some of their process waste and wastewaters into the KAFB drainage system. These potential sources of surface water contamination are summarized in table 3.5.1-1. This table also contains descriptions of wastes formerly discharged to the storm water system. Because flow occurs only for short periods following precipitation, surface waters at KAFB have not been routinely sampled.

Landfill 1 Drain System

Potential sources of contamination for this storm water drain system are discharges from industrial shops and exposed refuse from Landfill 1.

A number of industrial shops previously discharged diluted wastes into the storm water drain system. Those wastes included PD-680 from solvent washdown of aircraft, and washwaters from a paint shop and a plating and anodizing shop (see table 3.5.1-1). As in the case of the Control Tower drain system, industrial discharges from washracks to the Landfill 1 storm lines have been discontinued, and capping of access pipes to the drain system has been proposed.

Landfill 1 is an approximately 53-acre site operated from 1965 to 1975. Most of the landfill material is general refuse and building debris, but there is some evidence of hazardous materials (drums, oil-soaked insulation). There are no known analytical data on the quality of storm water after it passes the arroyo adjacent to the landfill. Soil samples collected from Landfill 1 have revealed the presence of lead (3 to 8 mg/kg), chrysene (0.99 mg/kg), di-n-octylphalate (1.1 mg/kg) and total petroleum hydrocarbons (30 mg/kg) (USAF, 1990a).

Control Tower Drain System

Storm water collected by the Control Tower drain system has two potential contamination sources: industrial shop discharges and the fire training area.

A number of industrial shops previously discharged untreated or partially treated wastes into the Control Tower drain system. These wastes were oils and solvents from the Propulsion Branch (building 336), pretreated in a grease-oil trap, and untreated washdowns of aircraft from the H3/H53 phase dock in Hangar 1000 (USAF, 1981). The discharge of liquid wastes from hangars and washracks to storm sewers has been discontinued. Kirtland AFB is planning to disconnect floor drains in maintenance facilities from the storm sewers, and to cap connecting pipes to the drain system (Davidson, 1991).

The 0.7-acre former fire training area at KAFB is located approximately 300 feet west of the Control Tower. The area consists of a partially concrete-lined training pit and three drain lines leading to the discharge ditch of the Control Tower drain system. In 1976, fire training was restricted to a 100-foot-diameter concrete pad, now severely degraded by fires. The pad is surrounded by an earthen berm, approximately 1.5 feet high. After training exercises, residual fuels were allowed to evaporate, and wastewaters were allowed to infiltrate into the soil or discharge to the storm water ditch (USAF, 1981). Discharge to the storm water system is now

Table 3.5.1-1. Liquid Wastes Formerly Discharged to Storm Sewer System by Industrial Shops at KAFB

Shop Name	Storm Sewer	Materials Handled	Influent Source	Pretreatment Method
Paint shop (building 1001)	Landfill 1	Paint booth water wastes	Paint booth washdown, cleanout	None
Plating and anodizing shop (building 1001)	Landfill 1	Plating wastes	Batch plating baths	Dilution prior to discharge
H3/H53 phase dock (building 1000)	Control tower	PD-680	Solvent washdown of aircraft	None
NWEF washrack (building 2636)	Landfill 1	Oils, sovents PD-680	Washdown of aircraft	Oil-water separator
Propulsion lab (building 336)	Control tower	Oils, solvents	Inside wash stall, old degreaser tank	Grease-oil trap
C-130 maintenance (building 1009)	Landfill 1	PD-680	Washdown of aircraft	Oil-water separator

Source: USAF, 1991a.

discontinued, and training exercises have been suspended (Davidson, 1991). Soil samples collected as a part of the Installation Restoration Program showed significant concentrations of JP-4 fuel, oils, and grease and detectable levels of halogenated organic compounds. Analysis of soil samples indicate the presence of JP-4 at concentrations as high as 47 mg/kg, and oil and grease to a depth of 20 feet. The maximum reported level of oil and grease was 6,500 mg/kg (USAF, 1991a).

3.5.2 Groundwater

Kirtland AFB lies within the Rio Grande underground basin, which is regulated by the State of New Mexico as a sole source of potable water. The source of groundwater is the Santa Fe aquifer, located in a geological formation composed of unconsolidated and semiconsolidated sedimentary deposits (USAF, 1981).

Groundwater generally flows northward across KAFB. A localized reversal of the regional groundwater gradients within the base has occurred as a result of extensive water pumping by the City of Albuquerque wells. Recharge of the Santa Fe aquifer is most likely to occur east of the base in the Manzano Mountains, where coarse-grained deposits of pediment material favor rapid infiltration (USAF, 1981).

Kirtland AFB operates a system of twelve production wells, located primarily in the west area of the base. The groundwater table at the project site is fairly deep; static water levels measured in August 1990 ranged from 310 to 487 feet below ground surface (USAF, 1991a). One of the base production wells (well 2) is located within the construction area of Taxiway E, approximately 150 feet northeast of Landfill 1. Water from these base wells complies with drinking water quality standards.

A shallow monitoring well, DM-01, was installed north of the abandoned landfill as part of the IRP. Analysis of water samples collected from DM-01 have indicated the presence of some contaminants (USAF, 1991a). A sample collected in January 1984 was analyzed for total organic carbon, total halogenated organics, and nitrates. Analysis showed a concentration of 0.02 mg/L (milligrams per liter) of organic chloride. A second sample from DM-01 was analyzed in April 1990 for halogenated volatiles, aromatic volatiles, semivolatiles, explosives, total and dissolved metals, forms of nitrogen, major anions, and petroleum hydrocarbons. Chromium was the only contaminant detected, at a concentration of 0.008 mg/L; 83 percent of the total metal concentration was present in dissolved form (USAF, 1990a).

Four additional monitoring wells will be installed downgradient of the abandoned landfill as part of the IRP at the KAFB (USAF, 1991a). The wells will be installed to determine if any contaminants are present or are migrating in the shallow groundwater system.

3.6 BIOLOGICAL RESOURCES

3.6.1 Terrestrial Biota

3.6.1.1 Vegetation

Vegetation at KAFB can be classified in two ecological associations according to a survey by Martin and Wagner (1974): a desert grassland association prevalent over most of the base area, and a pinyon-juniper association present at elevations above 5,800 feet.

The proposed activities for taxiway extension and drainage improvement at the base will be restricted to semidisturbed grasslands adjacent to the runways. In its natural state, the grassland association can contain more than fifty species of grasses, of which black gramma (*Bouteloua eripoda*) is the predominant species. Other common components of the association include galleta grass, sand drop-seed, sand muhly, three-awn grasses, sand sage and four-wing saltbush (Martin and Wagner, 1974).

Extension of Taxiway E will require modification of a semidisturbed desert grassland located between Kirtland Road and the east end of Runway 8-36. The approximately 20-acre area currently contains a dirt road and a 3-foot-high embankment parallel to the runway. The ground has been previously excavated for placement of several utility lines and culverts. Vegetation in the area is restricted to small patches of grass scattered over a barren sand terrain. Grounds maintenance occurs annually in semi-improved areas (USAF, 1990b).

Construction of Taxiways A and AA will occur in an urbanized area where no significant biological resources are present. Most of this area has been graded, developed, and paved. Isolated grass patches are found on small sections of bare sand terrain.

Drainage improvements for the central airfield area will take place over a narrow corridor which cuts across Runway 8-36 and associated taxiways and extends into a lightly developed grassland area south of the base where the Control Tower is currently located. The area features a relatively thick vegetation belt which lines the existing 1,400-foot drainage channel and the channel discharge area north of Kirtland Road, where the storm water retention basin will be constructed. The vegetation of the channel and impoundment area is characterized by shrubs and few bush species such as four-wing saltbush, Apache plume, and rabbitbush. Such vegetation is prevalent only along the margins of local arroyos (Martin and Wagner, 1974).

3.6.1.2 Wildlife

Wildlife at the base has been reported by Martin and Wagner (1974), Mariah Associates (1988), and USAF (ND). Birds are the most commonly reported wildlife in the area. Common species include the horned lark (*Eremophila alpestris*), western meadowlark (*Sturnella neglecta*), scaled quail (*Callipepla squamata*), starling robin (*Sturnus vulgaris*), and various species of doves, thrashers, and sparrows.

Because of the lack of competition from livestock, animals that feed on grasses can be abundant. These herbivores include the desert cottontail rabbit (*Sylvilagus audobornii*), black-tailed jackrabbit (*Lepus californicus*) and black-tailed prairie dog (*Cynomys ludovicianus*). A few large mammals, such as coyote, gray fox, and skunk, and a number of other small rodents have also been reported in the area.

Most wildlife is not likely to be found in the proximity of the construction sites, where physical barriers, airport noise, and road traffic already exclude all but the few species fully adapted to urban environments. These include several rodent and bird species which tolerate the noise and proximity of human activity. A somewhat richer fauna is expected to be associated with the Control Tower drainage channel, where a denser vegetation is present.

There are no fishing streams or lakes on KAFB, and hunting is not allowed on base. The base has implemented a wildlife management plan for protection and conservation of wildlife (USAF, ND).

3.6.2 Threatened, Endangered, and Special Status Species

According to a recent assessment, three federally listed endangered species occur in Bernalillo County where KAFB is located: the peregrine falcon (*Falcon peregrinus*), bald eagle (*Haliaeetus leucocephalus*), and the whooping crane (*Grus americana*) (USAF, 1990b). These species are also listed in the New Mexico list of endangered species (State of New Mexico, 1991). The wildlife management plan for the base indicates that only the bald eagle is likely to be present at the base, but the species prefers forested areas, far removed from the construction sites. The whooping crane is a transient migratory species which has been reported near the base on rare occasions (for example, if blown by a storm off its migratory route over the Rio Grande). No sightings of the peregrine falcon at the base have been documented. The black-footed ferret (*Mustela nigripes*) is an additional endangered species which could be found within a 50-mile radius of the base, but its presence in the area has never been reported (USAF, 1990b). The presence of any of these four species in construction areas adjacent to the airfield is very unlikely due to their rarity in the Albuquerque area and the absence or disturbance of their preferred habitats.

In addition, the Mexican spotted owl (*Strix occidentalis lucida*), listed as U.S. Fish and Wildlife Service (USFWS) category 2 candidate species, is not expected to be present within the proposed project areas (USAF, 1990a; 1991b; Svensky, 1991). Category 2 embraces those species for which complete documentation to support a ruling as an endangered species is lacking. Air Force regulations protect Category 2 species under the same conditions as threatened and endangered species (AFR 126-1).

Plant species of special concern are the Wright's pincushion cactus (*Mammillaria wrightii*), gramma grass cactus (*Toumeya papyrocanthus*), and lightflower visnegita (*Neoloidea intertexta*), listed by the State of New Mexico as sensitive species (prohibited collection in the state). The Wright's pincushion cactus and the lightflower visnegita are not expected to occur within the proposed project areas (USAF, 1990a, 1991b; Svensky, 1991), but the presence of the gramma grass cactus

in those areas is uncertain. Although the cactus has been reported to occur only in the national forest withdrawal area, far removed from the construction area (USAF, 1990b), a June 1990 survey found that the species was present near an urban area on KAFB where relocation of the Space Systems Division was proposed (USAF, 1990a). The gramma grass cactus is also a USFWS category 2 candidate species (Cully, 1991).

3.7 CULTURAL RESOURCES

3.7.1 Archaeological Resources

The prehistory and history of the southwestern United States has been well established, spanning 11,500 years of human habitation. In the area encompassing KAFB, archaeological evidence of human occupation has been found. A number of archaeological surveys have been conducted on KAFB, identifying the presence of over one hundred archaeological sites (Mariah Associates, 1988).

South and east of the runways, twelve archaeological sites have been recorded (USAF, 1978). Eleven of these were classified as prehistoric, and one was classified as historic. The prehistoric sites, classified as farming localities and stone tool manufacturing areas, contain architectural features and a variety of stone tools and ceramics. Architectural features consisted of agricultural terraces and field houses, indicative of farming activity. Although some of the prehistoric sites could not be dated, others were classified as pertaining to the Coalition period of the Middle Rio Grande Pueblo culture (A.D. 200-1325) (USAF, 1978). One historic ranching site was recorded, dating from the late nineteenth to early twentieth centuries. Ten of the prehistoric sites were considered eligible for the National Register of Historic Places; the historic site was considered potentially eligible; and one prehistoric site was not considered eligible (Mariah Associates, 1988).

Additional archaeological sites were identified during a recent preliminary survey for a proposed corridor south of Kirtland Road (Scanlon & Associates, Inc., 1990). Three of the identified sites were classified as prehistoric and contain stone tools and debris. Dump sites were also identified, one dating to circa 1940. The study noted that the Tijeras Arroyo and surrounding hills are dotted with numerous small prehistoric sites. Nodules of obsidian, a favored material for producing stone tools, are common in the gravel deposits of this area. Most of the sites are on tops of ridges and small hills where large amounts of gravel wash out. The study, which concluded that these sites warrant attention, recommended that a comprehensive archaeological survey be performed before any ground alteration was initiated.

3.7.2 Historical Resources

Aviation at KAFB began in the 1920s when a private airfield was built. In the late 1930s Albuquerque's municipal airport was developed, and by the early 1940s military aviation activities were initiated. Currently, the airport is a joint civilian- and military-use facility.

There are four known standing structures on KAFB that are 50 years or older (Mariah Associates, 1988). The function of these buildings has changed over the

years, and alterations were made to the structures. None of these buildings are located in the area of the proposed projects.

- Hangar 1 (building 20348), constructed during the late 1920s, was the first building constructed at the original Kirtland Field.
- Hangar 2 (building 20344), at the original Albuquerque Airport, was completed in 1930.
- The Transcontinental Air Transport Depot (building 20600) was completed in 1928 and held offices, a waiting room, a pilots headquarters, and a dining room.
- The Kirtland West Officers Club (building 1900), built in 1936, was one of five buildings of the Sandia School.

The two hangars and the depot were not originally considered eligible for the National Register of Historic Places, and the Officers Club was considered eligible "in time." In a recent architectural reanalysis of the structures, three of the buildings were considered potentially eligible to the National Register of Historic Places, and the Officers Club was considered to be eligible to the National Register (Mariah Associates, 1988). Further studies were recommended to document the historical significance of the buildings.

According to the office of Cultural Affairs, Historic Preservation Division of the State of New Mexico, the area of the proposed project is not within the boundaries of a district listed in the National Register of Historic Places, and there are no individually-listed properties or known eligible properties in the immediate project area (appendix A).

3.8 SOCIOECONOMICS

Both the regional and local environments are considered in the environmental discussion on socioeconomics. Since activities at AIA and KAFB either directly or indirectly influence the entire county, potential impacts on the Bernalillo County region are considered, with emphasis on activities in the Albuquerque metropolitan area and the airport-KAFB areas.

3.8.1 Population

In 1990, the population in the Albuquerque metropolitan statistical area (MSA) was estimated at 538,970. The area's population has grown by approximately 26 percent since 1980, when it totaled 427,100. During the past decade, the area has grown at an annual rate of 2.4 percent, after having grown at 3.1 percent a year during the 1970s (USAF, 1990a).

The County of Bernalillo had a population of 480,577 in 1990. This represents approximately 32 percent of the total population of New Mexico, which was 1,515,069 in 1990. The population of Bernalillo County is expected to grow to 647,000 by the year 2010, with the far northeast heights and the west mesa being the principal growth areas. In 1990, the Albuquerque municipal area had a population of 384,736 or 2,910.3 persons per square mile (MRGCG, 1991).

3.8.2 Housing

As of April 1990, there were 201,235 housing units in Bernalillo County, an increase of 954 units from 1988. There were 2.46 persons per dwelling unit in Bernalillo County in 1988 (MRGCG, 1991, MRGCG, 1988).

In 1990, 2,122 military personnel lived in family housing at KAFB and 47 military personnel lived in dormitory quarters. Approximately 52 percent of the military personnel live on the base, and 48 percent live in communities near the base. Most military personnel living off base reside in Albuquerque, but some live in other smaller communities in the area (USAF 1991b).

3.8.3 Employment and Economic Activity

In 1990, employment in the Albuquerque MSA was estimated at 253,920. With a labor force of 268,900, the unemployment rate is approximately 6 percent. The largest employment sectors are services (27.9 percent), wholesale-retail (25.7 percent), and government (19.7 percent). The manufacturing sector accounts for only 8.6 percent of the area's employment (USAF, 1990a).

The largest individual employers in Bernalillo County are the Albuquerque Public School System, Sandia National Laboratories, and KAFB (USAF, 1990a).

Employment in Bernalillo County is forecast to grow to 344,502 by the year 2010. It is projected that the manufacturing and services sectors of the economy will account for a larger proportion of the employment total in 2010 than in 1988.

As previously discussed in section 3.2, AIA is served by eight major and two regional airlines. Through the first 10 months of 1990, passenger traffic was up nearly 7 percent over 1989 and the total passenger count is expected to exceed five million by the end of 1991. The air freight business has grown in recent years and now accounts for a substantial part of air carrier traffic. The total number of aircraft operations at the airport is not expected to grow substantially as the airfield is nearing its capacity to handle traffic (Molzen-Corbin, 1990).

Kirtland AFB and non-DOD tenant units employed 4,847 military personnel, 1,249 National Guard and Air Force Reserve personnel, 3,128 appropriated-fund civilian personnel, 2,826 other civilian personnel, and 8,664 contractor personnel at the end of fiscal year 1989 (USAF, 1991b).

In fiscal year 1990, KAFB expenditures, including payroll, totaled $1,209,338,055. Of this sum, $123,595,293 was spent on construction and $334,562,531 was spent on services. The estimated total economic impact of annual operation expenditures was $3,299,557,950. Approximately 21,155 secondary jobs are supported off base by these expenditures. About 41,000 military, civilian, and nonbase personnel were employed by KAFB operations in 1990.

3.9 TRANSPORTATION

3.9.1 Existing Conditions

The transportation network in the KAFB area is shown on figure 3.9.1-1. The Albuquerque area is served by two major interstate highways, I-40 and I-25. These

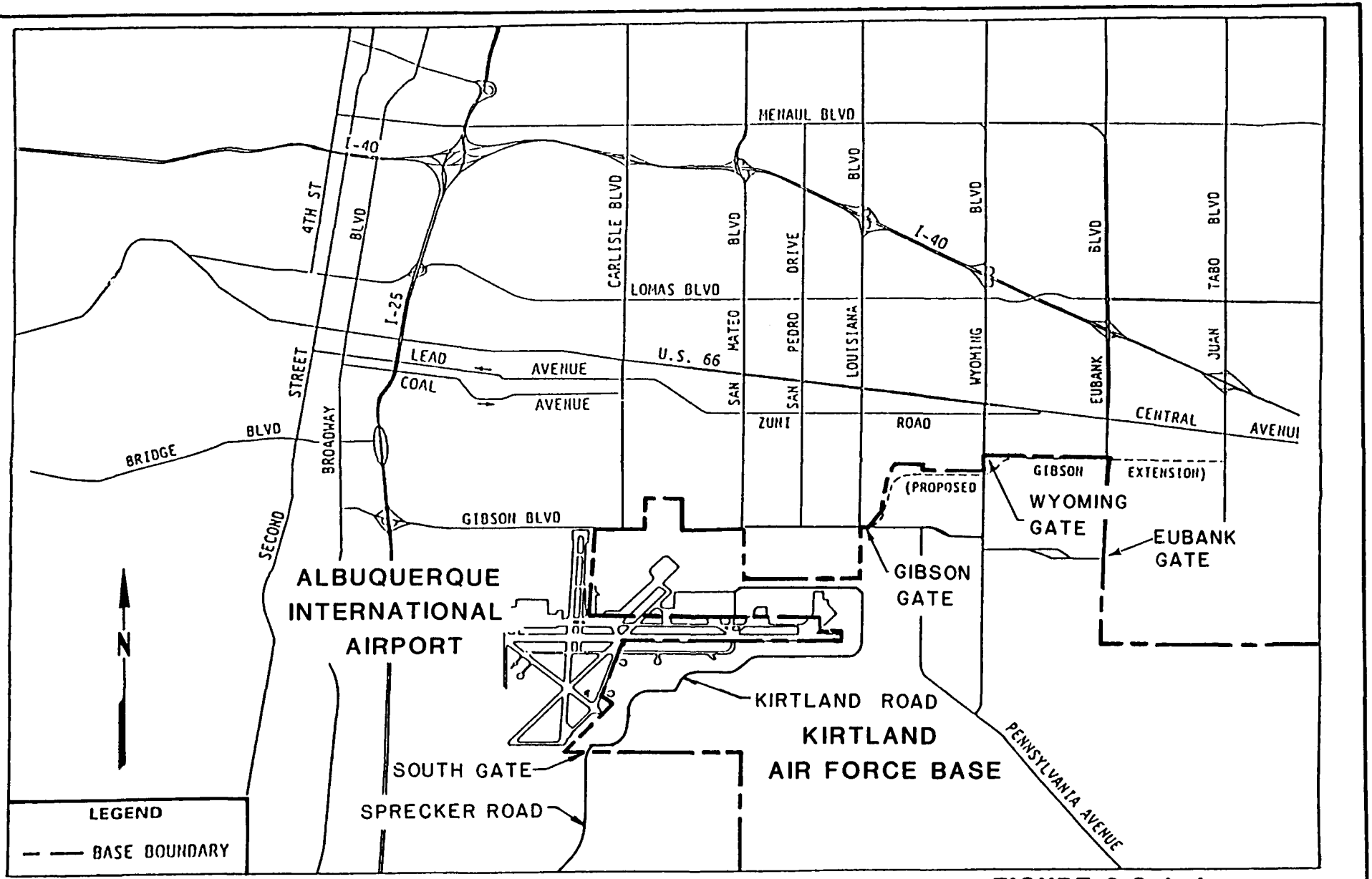


FIGURE 3.9.1-1
TRANSPORTATION NETWORK
IN THE VICINITY OF KIRTLAND AFB

two highways intersect in central Albuquerque and provide access to all major streets. Access to the base is through six entrance-exit gates. The Eubank Boulevard gate provides access to the base from the east; the Wyoming Boulevard gate provides access from the north; and the Carlisle Boulevard, Truman (at San Mateo Boulevard), and Gibson Boulevard (at Louisiana Boulevard) gates provide access from the north and west along Gibson Boulevard. The base can be accessed along the south end through the Sprecker Road gate.

Gibson Boulevard is a six-lane principal road with limited access extending from Broadway Boulevard (west of the base) to Louisiana Boulevard. Three of the five gates to the base are off Gibson Boulevard. To improve the east-west access near the base, the City of Albuquerque has proposed to extend Gibson Boulevard east from the Gibson gate across the northern portion of the base to Juan Tabo Road by the late 1990s (USAF, 1991b).

Carlisle Boulevard is a four-lane minor road extending from south of Gibson Boulevard north to Montgomery Boulevard. The residential areas north of Gibson Boulevard are served primarily by Carlisle Boulevard. San Mateo Boulevard is a four-lane road just north of Gibson Boulevard, widening to a six-lane principal road with limited access from just south of Central Avenue north to Interstate 25.

Louisiana Boulevard is a six-lane principal road extending from south of Gibson Boulevard north to Spain Road. Wyoming Boulevard is a six-lane principal road extending from inside KAFB to the north. Eubank Boulevard is a four-lane principal road south of Central Avenue, widening to six lanes north of Central Avenue. The KAFB east gate is on Eubank Boulevard.

Pennsylvania Avenue connects the Manzano area to the main part of the base where traffic is dispersed during peak periods to various entry gates. Traffic on Pennsylvania Avenue in the vicinity of the Manzano area is minimal; however, Pennsylvania Avenue is a convoy route leading to the munitions storage area at Manzano and, as such, is subject to periodic traffic disruption. Off-road parking areas are provided for vehicles on Pennsylvania Avenue during convoy maneuvers (USAF, 1991b).

Sprecker Road is a two-lane minor access road serving the south end of the base. Inside the base boundary, Sprecker Road changes to Kirtland Road. Sprecker gate is approximately 3 miles from I-25.

3.9.2 Traffic Volumes

Table 3.9.2-1 is a summary of roadway capacities and average daily traffic for road segments in the vicinity of KAFB. Traffic counts conducted in March 1988 showed a total of 24,800 and 21,800 vehicles per day at the Wyoming and Gibson gates, respectively. Sprecker gate receives approximately 600 vehicles per day (BCPWD, 1991). Traffic analyses for Sprecker Road have not been completed; therefore, its vehicle capacity is not included in table 3.9.2-1.

Table 3.9.2-1 Comparison of Daily Traffic Volumes to Estimated Roadway Capacities for Road Segments in the Vicinity of Kirtland AFB, New Mexico

Road Segment	Roadway Capacity	Existing Conditions[1] ADT[2]	Existing Conditions[1] V/C Ratio[3]	Existing Conditions[1] LOS[4]	Projected Conditions ADT	Projected Conditions V/C Ratio	Projected Conditions LOS
Gibson Blvd.							
I-25 to Carlisle Blvd.	50,400	37,400	0.74	C	42,131	0.78	C
Carlisle Blvd. to San Mateo Blvd.	50,400	36,200	0.72	C	40,779	0.76	C
San Mateo Blvd. to Louisiana Blvd.	50,400	32,800	0.65	B	36,949	0.68	B
Carlisle Blvd.							
Gibson Blvd. to Central Avenue	26,400	9,800	0.37	A	11,040	0.42	A
Central Avenue to Lomas Blvd.	12,000	8,500	0.71	B	9,575	0.80	D
San Mateo Blvd.							
Gibson Blvd. to Central Avenue	28,800	29,700	1.03	F	33,457	1.16	F
Central Avenue to I-40	43,200	47,700	1.10	F	53,734	1.24	F
Louisiana Blvd.							
Gibson Blvd. to Central Avenue	36,000	23,700	0.66	B	26,698	0.74	C
Central Avenue to I-40	36,000	34,000	0.94	E	38,301	1.06	F
Wyoming Blvd.							
Central Avenue to I-40	43,200	40,300	0.93	E	45,398	1.05	F
Central Avenue to Wyoming Gate	43,200	24,800	0.57	A	27,937	0.65	B
Eubank Blvd.							
South of Central Avenue	28,000	13,700	0.48	A	15,433	0.54	A
Central Avenue to I-40	43,200	30,300	0.70	B	34,133	0.79	C
I-40 to Menaul Blvd.	43,200	33,100	0.77	C	37,287	0.86	D
Central Avenue							
Carlisle Blvd. to San Mateo Blvd.	43,200	37,300	0.86	D	42,018	0.97	E
San Mateo Blvd. to San Pedro Blvd.	43,200	36,400	0.84	D	41,004	0.95	E
San Pedro Blvd. to Louisiana Blvd.	36,000	34,900	0.97	E	39,315	1.09	F
Louisiana Blvd. to Wyoming Blvd.	43,200	36,300	0.84	D	40,892	0.95	E
Wyoming Blvd. to Eubank Blvd.	43,200	35,000	0.81	D	39,427	0.91	E
Eubank Blvd. to I-40	43,200	31,900	0.74	C	35,935	0.83	D

Table 3.9.2-1, continued

Road Segment	Roadway Capacity	Existing Conditions[1] ADT[2]	Existing Conditions[1] V/C Ratio[3]	Existing Conditions[1] LOS[4]	Projected Conditions ADT	Projected Conditions V/C Ratio	Projected Conditions LOS
Interstate 40							
I-25 to Louisiana Blvd.	84,000	133,000	1.58	F	149,824	1.78	F
San Mateo Louisiana Blvd.	126,000	124,000	0.98	E	139,685	1.11	F
Louisiana Blvd. to Wyoming Blvd.	126,000	101,600	0.81	D	114,452	0.91	E
Wyoming Blvd. to Eubank Blvd.	126,000	79,800	0.63	B	89,894	0.71	C
Eubank Blvd. to Central Avenue	126,000	61,000	0.48	A	68,716	0.55	A

[1] Traffic data obtained from Middle Rio Grande Council of Governments.

[2] Average daily traffic.

[3] Ratio of ADT volume to roadway capacity.

[4] Level of service (from *Highway Capacity Manual*, Highway Research Board Special Report 209, National Academy of Services, Washington, D.C.

A = Low volumes; high speeds; speed not restricted by other vehicles; all signal cycles clear with no vehicles waiting through more than one signal cycle. (volume-to-capacity ratio = 0.00 to 0.60)

B = Operating speeds beginning to be affected by other traffic; between 1 and 10% of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods; recommended ideal design standards. (volume-to-capacity ratio = 0.61 to 0.70)

C = Operating speeds and maneuverability closely controlled by other traffic; between 11 and 30% of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods; recommended ideal design standards. (volume-to-capacity ratio = 0.71 to 0.80)

D = Tolerable operating speeds; 31 to 70% of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods; often used as a design standard in urban areas. (volume-to-capacity ratio - 0.81 to 0.90)

E = Capacity; the maximum traffic volume an intersection can accommodate; restricted speeds; 71 to 100% of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods. (volume-to-capacity ratio = 0.91 to 1.00)

F = Long queues of traffic; unstable flow; stoppages of long duration; traffic volume and traffic speed can drop to zero; traffic volume will be less than the volume which occurs at LOS E. (volume-to-capacity ratio > 1.00)

[5] Source: USAF, 1991b.

Traffic problems on the base are generally confined to the peak hour, when major streets – Gibson Boulevard, Wyoming Boulevard, and Pennsylvania Avenue north of "O" Street – become congested. The base has implemented staggered work schedules and one-way streets in certain areas of the base to minimize congestion, particularly during peak traffic periods. Traffic diffuses rapidly throughout the major streets and highways outside KAFB.

3.9.3 Operating Conditions on Roadways

A comparison of daily traffic volumes and volume-to-capacity ratios for selected roadway segments in the vicinity of the base is presented in table 3.9.1-1. Existing daily traffic volumes were compared with level of service (LOS) E roadway capacities to arrive at a volume-to-capacity ratio and corresponding LOS of operation. Estimated roadway capacities were obtained from the Middle Rio Grande Council of Governments and are considered to be very conservative. Roadway capacities were derived using the *Highway Capacity Manual*. Theory and actual capacities may be quite higher. Many of the roadway segments analyzed currently operate at LOS E or F based on the estimated roadway capacities. Projected 1996 daily traffic volumes for roadways in the vicinity of the base are presented in table 3.9.2-1. These projections do not assume any major increase in activity at KAFB (USAF, 1991b).

Projected conditions are based on a 2 percent annual increase in traffic volumes. The 1996 daily traffic volumes were compared to LOS E roadway capacities to arrive at a volume-to-capacity ratio and corresponding operational LOS. Several roadway segments are anticipated to operate at LOS E in 1996, including segments of Central Avenue, San Mateo Boulevard, Wyoming Boulevard, and Louisiana Boulevard (USAF, 1990b).

3.10 ENVIRONMENTAL MANAGEMENT

3.10.1 Sanitary Waste

Most of the sanitary sewage produced by KAFB is treated by the City of Albuquerque at a combined trickling filter and activated-sludge treatment plant with a capacity of 60 million gallons per day (mgd). The base presently contributes an average wastewater flow of 2.27 mgd to the city's facility. The wastewater flow is projected to increase to 2.31 mgd by 1996 (USAF, 1991b). Sewage from base installations located south of the Tijeras Arroyo is collected in a separate septic tank system (USAF, 1991b).

Solid waste from the base is sent to an on-base disposal site with a projected life span of 10 years (USAF, 1990a).

3.10.2 Industrial Waste

Kirtland AFB does not have separate industrial and municipal wastewater systems. Industrial discharges from the base to sewer lines is regulated by an industrial pretreatment program administered by the City of Albuquerque. Four manholes are used for monitoring the discharged water quality. Additional monitoring manholes will be located in newly constructed sewer lines. Wastewater

discharges from the base are not currently regulated by an national pollutant discharge elimination system (NPDES) permit (USAF, 1990b).

Industrial nonhazardous wastes are transported by a contractor to designated disposal sites at the base. All solid wastes are disposed of in accordance with USAF and KAFB regulations.

A number of potentially hazardous wastes are used and stored at the base. An annually updated management plan is followed for collection, storage, and disposal of hazardous waste in accordance with applicable federal, state, and local standards. Special guidance documents are followed for disposal of asbestos, hydrazine, and radioactive materials, and for spill prevention (USAF, 1990b).

Hazardous wastes generated at KAFB are associated with the following activities: operation of industrial shops and research and development laboratories; pesticide and herbicide application; radiological testing; fire control training; and fuel management. Wastes generated by these activities vary yearly depending on research activities and mission assignments. Wastes include petroleum, oil, and lubricant (POL) wastes, and waste surplus chemicals such as halogenated solvents, polychlorinated biphenyls (PCBs), silver-bearing photographic materials, acids and bases, and nonhalogenated solvents and organic compounds.

Kirtland AFB operates as a generator of hazardous waste and as a treatment, storage, and disposal facility. Collection and storage of hazardous waste is regulated by a Resource Conservation and Recovery Act (RCRA) Part B permit issued by the State of New Mexico. The collection and storage sites are operated by the Defense Reutilization and Marketing Office, which arranges offsite disposal of the wastes. Some wastes, such as POL, are picked up by outside contractors at designated collection points. Photographic laboratory wastes are discharged to the sanitary sewers following silver removal and neutralization. A management and operation plan is currently being implemented for asbestos materials found in numerous buildings at the base (USAF, 1991b).

3.10.3 Installation Restoration Program

To comply with the 1980 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Department of Defense initiated the Installation Restoration Program to identify, report, and correct any contamination at KAFB that could potentially produce groundwater contamination.

The initial phase of the IRP identified twenty-one sites at KAFB as potential contamination sources (USAF, 1981). In a subsequent phase (phase II, stage 1), seven of those sites were selected for acquisition and analysis of preliminary environmental data to identify the environmental status of each site and develop alternatives for remedial action (USAF, 1985). Based on results of these two studies and on sampling conducted by the New Mexico Environmental Division, ten sites were selected for further environmental evaluation (USAF, 1991a).

Two sites identified as having potential surface and groundwater contamination are located in the vicinity of the Taxiway E improvement project: Landfill 1 and the

fire training area. They are identified in the IRP work plan as sites 1 and 4, respectively.

Landfill 1, located south of Runway 8-26 and Kirtland Road, was built along the sides of an unnamed arroyo which receives runoff from the Landfill 1 drainage system. As described in section 3.5.1, erosion of the landfill edges along the arroyo has exposed refuse material which could potentially contaminate surface water runoff. Samples of soils and shallow groundwaters at the landfill site have identified contaminants such as chromium, lead, total petroleum hydrocarbons, and a few organic contaminants as discussed in sections 3.5.1.2 and 3.5.2 (USAF, 1991a). Proposed modifications include improving the drainage through the Kirtland Road embankment.

Runoff from the fire training area could be discharged to the drainage ditch of the Control Tower drain system. Soil samples collected at the site have shown various contaminants including JP-4 and halogenated organic compounds as discussed in section 3.5.1.2. Drains from the fire training area are not currently in use (USAF, 1991a).

SECTION 4

ENVIRONMENTAL CONSEQUENCES

4.1 MISSIONS AND OPERATIONS

4.1.1 Facility Relocation and Construction Activities

Construction of Taxiway AA will require relocating the Base Operations facilities, which consist of office space, vehicular and aircraft parking. The Air Force is considering four locations as shown in figure 2.2-1. This section will identify and describe potential impacts to the Air Force associated with each alternative. The alternatives are discussed in order of most desirable to least desirable. For alternatives 1, 2, and 3, construction of a new apron will be required because Apron A will be used for the new taxiway AA, which will be transferred to the city.

4.1.1.1 Preferred Alternative

The preferred alternative is to relocate Base Operations to Hangar 1002, located on the east end of Apron E, just north of Taxiway A (figure 2.2-1). This facility will be occupied by the Navy until December 1992, when the unit will either be reassigned to another base or dissolved. This alternative would be least costly since it would not require constructing a new structure or concrete parking area. The facility has quick access to Taxiway A, and aircraft maintenance could probably be performed inside the hangar.

The hangar is also located closer to the fire station, and emergency response time will be much shorter than if Base Operations is relocated near the Control Tower (see alternatives 2 and 3). According to Base Operations personnel, fire trucks responding to an aircraft emergency from their current location may not be able to meet FAA time limit guidelines (Badgett, 1991a). However, the fire department is planning to relocate the fire station next to the existing control tower, by the end of 1991, so that it will be more centrally located with respect to the rest of the airport facilities.

Since Hangar 1002 is located in a well-developed area of the base which has already been substantially altered from its natural state, no impacts to vegetation or wildlife are expected from implementation of this alternative. Likewise, the remaining environmental quality parameters examined in this EA would not be impacted by the selection of this alternative.

4.1.1.2 Alternative 1

This alternative consists of constructing a new office structure adjacent to Apron B and upgrading a portion of the existing apron for aircraft parking. The existing asphalt is in such poor condition that a new apron would need to be constructed. During construction of the apron access to the northeast end of the apron would be difficult for Ross Aviation and DOE. Therefore, other means of access for those tenants may need to be considered for this alternative to be acceptable.

Like the preferred alternative, the environmental quality parameters examined in this EA would not be impacted by the action of this alternative.

4.1.1.3 Alternative 2

This alternative consists of constructing a concrete apron between Hot Pads 1 and 2 and using the existing office building at the Control Tower. Base Operations would not be able to occupy these facilities for approximately 2 years. This alternative would require that the proposed 96-inch-diameter concrete storm sewer pipe (to be located in the drainage ditch just west of the Control Tower) be designed to extend an additional 300 feet under the concrete apron and withstand much heavier loads imposed by the thick apron and moving aircraft (see figures 2.2-1 and 3.5.1-1).

The drainage ditch would also receive a considerable amount of storm water runoff because precipitation would fall on the concrete apron instead of the airport mesa. The size of the apron would be approximately 10 acres. The retention basin proposed for the project may be impacted by this additional amount of water if the basin were not designed to store it.

Minimal impacts to vegetation and wildlife would be expected since the area proposed for the apron has been previously disturbed. Other environmental quality parameters would not be impacted by selection of this alternative.

A decision to move Base Operations to this location would need to be made prior to design and construction of the concrete sewer pipe (and retention basin); otherwise, if the sewer pipe were not designed for the heavier loads, the pipe may eventually fail, causing blockage in the pipe and backup and ponding of water on surfaces of the taxiways and runway.

4.1.1.4 Alternative 3

The final alternative involves constructing a 10-acre concrete apron between Hot Pads 2 and 3, as in the second alternative, and using the existing office building at the Control Tower. These facilities would not be available to occupy for about 2 years.

If this alternative is selected, construction of the apron will not commence until after the IRP investigations for the fire training area have been completed (summer 1991); therefore, the construction activities would not be impacted by the investigations. However, as previously discussed in section 3.5.1.2, significant concentrations of JP-4 fuel, oils, and grease and detectable levels of halogenated organic compounds were discovered during previous sampling events in this area. Design of

the drainage from the concrete apron would have to be closely correlated with IRP investigations to assure that the runoff would not pass through contaminated areas of the soil.

As in the second alternative, the retention basin may be impacted by the addition of storm water if the apron is constructed and the water from the area is discharged to the retention basin.

Other environmental quality parameters discussed in this EA would not be impacted by selection of this alternative.

4.1.2 Operational Area Access

The access areas to the hot pads located adjacent to Taxiway E – especially Hot Pad 1 – will be intermittently disrupted for the entire construction period. However, Hot Pad 5, including the safety area at the end of Runway 26, must be available for use by DOE at all times. Hot Pads 1, 2, 3, and 4 are used infrequently; however, the mission and operations of some tenants may be affected if operational use of the pads is discontinued for more than 1 month at a time.

Access to Hot Pad 1 is expected to be closed during most of Taxiway E construction. Hot Pad 1 is used infrequently by Phillips Laboratory; however, blocking access to this area during the entire duration of the construction period would impact their mission. Since Hot Pad 2 is also available from Taxiway G, access to this area should not be impacted by construction activities as long as aircraft can taxi to the runways.

The NMANG will temporarily use Hot Pad 3 for their arm-dearm activities during construction of Taxiway E. As a result of this action, a revetment (projectile barrier) will need to be constructed on the southwest side of the hot pad. Access to this pad is from Taxiway G and should not be affected by construction activities provided aircraft can taxi to Runways 8-26 and 17-35 during construction work.

Access to Hot Pads 4 and 5 should not be affected by construction activities. While work is performed on Taxiway E, Hot Pads 4 and 5 can be accessed from Taxiway A through the safety zone at the east end of Runway 8-26. Likewise, when construction work is performed on Taxiway A, the pads can be accessed from the new Taxiway E extension.

Tenants along Apron B will be affected during construction of Taxiways A and AA since access to this area will be completely closed off unless mitigative measures are implemented. Tenants along Apron B include Ross Aviation, DOE, and the Aero Club. Significant impact to the missions of these organizations may occur if alternative access routes are not provided for them.

The training mission of the 1550th CCTW may be impacted during construction of Taxiway AA since three of the six helicopter pads will be eliminated. Instead of helicopters taking off in groups of three, the pilots will have to take off individually, regrouping at the helicopter airfield at the southwest end of the base. This impact is not considered significant since the 1550th CCTW could change its training needs to

adjust for the reduced number of pads, or, alternatively, new pads can be designated in the vicinity of Aprons B and E (Badgett, 1991c).

Base Operations may be impacted by the construction of Taxiway AA if the facility has not been moved to its new location by the time Taxiway AA is under construction. Aircraft loading and unloading operations could take place on Taxiway F during construction activities, and operations involving transient military aircraft could be provided by other Air Force bases. Therefore, significant impacts are not expected to affect the mission or operations of this facility.

The mission and operations of the Naval Weapons Evaluation Facility will not be affected by construction of the proposed project since the organization will have moved by the time construction has commenced.

4.1.3 Land Use

The construction and extension of Taxiway E will occur in areas already designated as open space, according to the KAFB land use map. However, the buffer zone for one of the explosives storage facilities (area 750) encompasses the area up to the edge of Runway 8-26, including Taxiway E. The quantity distance (QD) for area 750 is 1,250 feet; however, the QD separation has been reduced to 750 feet according to the KAFB Chief of Safety. The decision to reduce the QD is stated in the Public Transportation Route Criteria in Air Force Regulation 127-100. According to the Chief of Safety, as long as the extension of Taxiway E is constructed parallel to Runway 8-26, then the QD can effectively be reduced for vehicles and aircraft operating in the area (Kamhoot, 1991b; Hider, 1991). This action would eliminate land use conflicts during construction and future aircraft operations on Taxiway E due to the QD of the explosive storage facilities.

Taxiways A and AA are already located in an area designated as taxiways, runways, and aprons. Therefore, construction associated with the proposed project is consistent with current land use because this portion of the base contains facilities involved in aircraft mobilization and maintenance activities.

The land use designated for the relocation of Base Operations is consistent with the present use of the land areas; therefore, impacts to land use are not expected.

Other than functional designations, the proposed action is not expected to result in a change to any land use designation of the approximately 70 acres of Air Force property.

4.1.4 Cumulative Impacts

Cumulative impacts on the mission and operations of KAFB are not expected to occur from construction and operational effects of the proposed project. In fact, the base will benefit from the project since it will increase the efficiency of Runway 8-26 and allow easier access to Air Force facilities and tenant organizations located along both sides of the runway.

4.2 PROPOSED AIRCRAFT OPERATIONS

4.2.1 Aircraft Operations

Construction of Taxiway E is scheduled to begin about January 1992 and continue for up to 18 months. This may entail closing Runway 8-26 for up to a 4 month period. When Runway 8-26 is closed, all major commercial and military aircraft must use Runway 17-35. Runway 17-35 is about 3,000 feet shorter than Runway 8-26 and runs in a north-south direction. When aircraft take off or land on this runway (usually due to changing wind directions or runway maintenance) for any length of time, local residents complain about noise because the aircraft must fly over populated areas of Albuquerque.

Construction activities associated with the proposed action may affect NMANG flying and training activities since partial closure of Runway 8-26 will require their aircraft to taxi longer distances to Runway 17-35. Aircraft performance during takeoff is affected when temperatures exceed 85°F at the higher altitudes in this region. To compensate for this, the amount of fuel stored in the aircraft must be reduced to lighten the weight of the planes, or a longer runway must be used. Therefore, the additional time it will take for the aircraft to taxi to Runway 17-35 (approximately 20 to 30 minutes) and the decrease in the amount of fuel per aircraft during summer periods may reduce the amount of sorties (round trip flights per aircraft) the NMANG can fly from an average of about 1.4 to 0.7 sorties during their training missions (Badgett, 1991b).

Other potential impacts to NMANG include the relocation and temporary closure of their arm-dearm apron and protective barrier during construction of Taxiway E. The apron is located at the turn at the east end of the existing Taxiway E and has five spaces for parking aircraft. The apron also has a projectile barrier which measures 270 feet long by 12 feet high and consists of a double heavy timber wall filled with compacted soil. To compensate for the temporary closure of the arm-dearm facility, it will be temporarily relocated at Hot Pad 3. A permanent location for the arm-dearm apron and berm will be constructed on Air Force property after Taxiway E has been completed. This impact will not be significant for NMANG operations.

Helicopter operations of the 1550th CCTW may be impacted during construction of Taxiway AA since three of the six helicopter pads located near ramp M6 on the west side of Apron E will be eliminated. Instead of the helicopters departing in two groups of three, the pilots will have to depart individually or in one group of three and regroup at the helicopter airfield at the southwest end of the base (Badgett, 1991a). As previoulsy discussed in section 4.1.2, this impact is not considered significant since new pads can be designated in the vicinity of Aprons B and E.

4.2.2 Runway and Taxiway Utilization

During construction of Taxiway E, it is anticipated that Runway 8-26 will be closed for up to 4 months continuously. The construction of Taxiways A and AA is also expected to necessitate closing Runway 8-26 for the same duration. Larger commercial and military aircraft will be required to use Runway 17-35 whenever

Runway 8-26 is closed. Use of Runway 17-35 increases traffic along its taxiways. The increase in traffic will likely cause enough congestion that departures and arrivals of commercial and military aircraft will be delayed. Tenant organizations whose missions rely on some type of aircraft (transport, training, or services) will likely experience delays in operations.

4.2.3 Airspace Management

Airspace surrounding KAFB is expected to be affected during proposed construction activities. Runway 8-26 usage will be limited and occasionally closed, with aircraft diverted to Runway 17-35 or other runways. Since only Runway 8-26 allows aircraft to avoid Albuquerque residential area airspace, increased use of alternate runways will heighten noise levels over populated areas. According to the AIA Noise Abatement procedures, engine run-ups during maintenance are restricted between the hours of 10:00 P.M. and 7:00 A.M. Analysis of noise levels surrounding the base is discussed in section 4.4.

Personnel at Base Operations will be required to notify FAA of any impending use limitations of airport facilities. FAA notifies all pilots ("Notice to Airmen") at airports throughout the U.S. The notice lists all airports which will be closed or have limited use on specific days. Double Eagle Airport is expected to receive some of the smaller aircraft currently using AIA or KAFB. The redirection of transient aircraft from KAFB to other military airfields is not expected to present any major difficulties for transient aircraft.

4.2.4 Flight Safety

The proposed construction activities at KAFB will require coordination between the construction contractor and Base Operations. The airport operator is responsible for establishing and using procedures for immediately notifying airport users and the FAA of any conditions adversely affecting operational safety.

The construction contractor will be required to follow FAA safety protocol according to advisory circular (AC) 150/5370-2C. The advisory circular contains guidelines for use in preparing plans and specifications for construction activities that may interfere with aircraft operations. Safety zone requirements will also need to be established and should be coordinated among the contractor, the Air National Guard, KAFB base safety, and other tenants of KAFB.

The NMANG has identified a concern that must be addressed during the proposed construction. During construction, the surfaces of Taxiways A and E must be cleaned of rocks, dirt, and other small debris so that these materials do not get blown or drawn into aircraft engines. Some types of military aircraft, such as the A-7D and F-16, are especially vulnerable since their engines are closer to the ground than most aircraft.

The entrance ramps to the NMANG area, M2 and M3, from Taxiway A cannot be blocked during proposed construction since there is not enough clearance for two aircraft to taxi side by side on the ramps. Construction in this area should be scheduled with the NMANG prior to start of any work.

No adverse consequences are expected from increased air traffic at other airports. Air traffic controllers will be required to follow standard operating procedures to assure that flight safety is maintained.

4.2.5 Cumulative Impacts

Several major projects are scheduled to be constructed during the same time period as construction of the proposed project. These construction projects, near Taxiway A, are expected to be completed by the time construction of the taxiway has commenced, with the possible exception of the new corrosion control facility. This building is scheduled for completion sometime in fiscal year 1993. However, given the size of the construction for the structure and its distance from the project site, it is not expected to impact aircraft operations.

Another major project scheduled for construction during the repair of Taxiway A is the repair and resurfacing of Apron E. This project will be phased over a 5-year period beginning in fiscal year 1992. The project to resurface Apron E may have some impacts during the construction of Taxiways A and AA. However, as long as one of the two ramps to Apron E can be accessed during construction of both projects, then the construction will not significantly affect aircraft operations.

None of the construction projects will occur in the vicinity of Taxiway E. Therefore, it is anticipated that cumulative impacts on aircraft operations from construction activities along Taxiway E will not occur.

4.3 AIR QUALITY

In the short term, excavation and construction work on Taxiways A, AA, and E and high-speed exit ramps on Runway 8-26 will impact air quality primarily through the possible use of an onsite asphalt batch plant, topsoil disturbance from construction activities (fugitive dust), and construction vehicle emissions. Long-term impacts of the project are minimal, since none of the proposed changes to the airfield will result in any new emission sources. In fact, the new construction may reduce long-term emissions since taxiing times and aircraft ground movement constraints will be lessened, allowing more efficient use of the facilities.

The proposed construction calls for closing Runway 8-26 for approximately 4 months, during which aircraft will be diverted to Runway 17-35. This will not result in any increase in flights; in fact, a slight decrease in flights may occur. Therefore, impact from temporarily closing Runway 8-26 is negligible to regional and local air quality. Furthermore, since the number of flight operations will supposedly not increase, long-term impact to the air quality from the proposed changes will be negligible.

4.3.1 Calculations of Emissions from the Proposed Project

The primary sources of fugitive dust during construction will be wind-blown dust from excavation of the old taxiway subsurface and pavement, grading and hauling activities, and dust and combustion emissions from the asphalt batch plant stack. Emission factors for fugitive dust and combustion emissions from these sources were

obtained from the EPA's *Compilation of Air Pollution Emission Factors*, AP-42, volumes I and II.

For the asphalt batch plant, it was conservatively assumed that the batch plant will produce all necessary asphalt in 1 year. TSP and PM_{10} emissions were determined for three scenarios: an uncontrolled case; use of a high-efficiency cyclone which has a theoretical removal efficiency of 94 percent for PM_{10}; and use of a wet venturi or orifice scrubber which is expected to remove 99.7 percent of PM_{10}.

The proposed area of disturbance for Taxiways A and AA is conservatively thought to represent a worst-case scenario for the amount of land to be disturbed at any one time. Fugitive dust or particulate emissions were assumed to be reduced by 50 percent through the application of water at least twice daily on the soil during and after grading activities. Fugitive dust emissions from the construction activities on Taxiways A and AA were estimated based on the sum of the areas disturbed. The lengths of the taxiways were summed and a width of 125 feet was assumed. (The actual finished taxiway width will be 75 feet.) An extra width of 50 feet was assumed to accommodate the area needed for trucks and other vehicles operating in the construction area for both taxiway areas.

The calculations determining emissions from the engines of heavy equipment operating on site were based on hours of operation and the number and types of equipment. Estimation of the amount of equipment on site was performed using *Means Heavy Construction Cost Data, 1991* and the proposed project duration of 18 months for Taxiway E and an additional 18 months for Taxiways A and AA. Equipment usage estimations (hours per year) and the equipment emission rates were taken from AP-42 volume II.

Table 4.3.1-1 presents the project's emission totals and compares these amounts with Bernalillo County's emissions inventory to show the effect of this work on regional air quality. As can be seen from this table, only emissions of SO_2 are an appreciable part (30.25 percent) of the county's emissions inventory. Although this is a significant part of the county's inventory, the county has a very low inventory of SO_2 and even a modest quantity increase appears as a high percentage. SO_2 emissions should not result in any significant detrimental effects to local or regional air quality.

Overall, it is anticipated that properly mitigated emissions from the project will have a minor impact on regional air quality. However, local effects may be more severe, especially for TSP and PM_{10} emissions, for which emission rates are significantly higher than those of the other contaminants. Therefore, several air dispersion scenarios were modeled to further investigate the effects of the construction on the base personnel and the nearby public areas.

4.3.2 Air Dispersion Modeling Scenarios and Results

Emissions of TSP and PM_{10} were modeled to evaluate the health impact on base personnel and nearby local residents. The model used was EPA's "Fugitive Dust Model" version 91028. Meteorological data used were for the year 1987, collected at the Albuquerque International Airport weather station. Figure 4.3.2-1

shows emission sources (areas of disturbance or point sources modeled) and the surrounding areas. The scenarios modeled for the construction of Taxiways A, AA, and E were maximum hourly emission rates and annual emission rates. The maximum hourly situations consisted of evaluating the effects of just the batch plant with a cyclone and with a wet scrubbing system, the effects of soil disturbance due to taxiway reconstruction only, and the combined effects of these scenarios. The scenarios for annual emissions considered the combined effects of the taxiway reconstruction and the batch plant. The impacts of construction activities were evaluated at seventeen local critical receptors for the different modeling scenarios. Concentrations were calculated for nearby base facilities, base housing, U.S. Veterans Hospital, Bataan Memorial Hospital, three nearby schools, and other receptors.

4.3.3 Project Air Quality Impacts

The primary short- and long-term air quality impacts resulting from operations of the completed taxiway extension project are considered negligible. Short-term impacts from construction and corresponding emissions of TSP and PM_{10} could have a much greater impact if proper mitigative measures are not utilized. Tables 4.3.3-1 and 4.3.3-2 summarize the expected regional and local ambient air impacts from the project's anticipated maximum hourly and annual fugitive dust emissions. As shown in table 4.3.3-1, the batch plant with only a cyclone for emissions control is the source of greatest impact on the critical receptors. It is apparent that the maximum hourly impacts from the batch plant with just a high-efficiency cyclone for emissions control results in numerous exceedances of the federal standards for PM_{10}. When a wet venturi or orifice scrubber is used for control, emission rates exceedances do not occur.

Emissions from heavy equipment movements and disturbed soils do not result in large exceedances of federal standards at off-base receptors. The 24-hour federal standard is exceeded from construction activities on Taxiways A and AA for the nearby on-base receptors.

As demonstrated in table 4.3.3-2, particulate emissions do not cause exceedances of the federal standard on an annual basis. Also, the projected annual impacts from this project will not cause annual exceedances if the effective mitigative measures suggested are implemented.

4.3.4 Cumulative Air Quality Impacts

Considering the cumulative effects of the area's ambient 24-hour average PM_{10} concentrations and those expected from this project, it is likely that PM_{10} exceedances will occur. Ambient concentrations of PM_{10} in the vicinity of KAFB currently account for 25.4 percent of the 24-hour average standard and 55.2 percent of the annual arithmetic mean standard. Thus, it is evident that the federal 24-hour average standards will be exceeded without mitigative measures.

Table 4.3.1-1 Project Emissions and Comparison with Bernalillo County Emissions Inventory

Total Project Emissions	TSP	PM_{10}	SO2	NOx	HC	CO
Hourly emissions (lb/hr)						
Batch plant (wet scrubber controls)	10.01	4.00	73.05	9.01	7.00	9.51
Construction disturbance (mitigated)	338.33	77.82				
Equipment engine emissions	6.64	1.53	8.92	83.62	6.03	30.45
	354.97	83.34	81.96	92.63	13.04	39.96
Annual emissions (ton/yr)						
Batch plant (wet scrubber controls)	10.09	4.03	73.63	9.08	7.06	9.58
Construction disturbance (mitigated)	378.93	87.15				
Equipment engine emissions	7.43	1.71	11.08	101.52	6.08	39.92
	396.44	92.90	84.71	110.60	13.14	49.50
Comparison of project construction emissions with Bernalillo County emissions						
Construction emissions (ton/yr)	396.44	92.90	84.71	110.60	13.14	49.50
Bernalillo County emissions (ton/yr)	60,847	NA	280	15,967	22,154	183,424
% of County emissions	0.65	NA	30.25	0.69	0.06	0.03

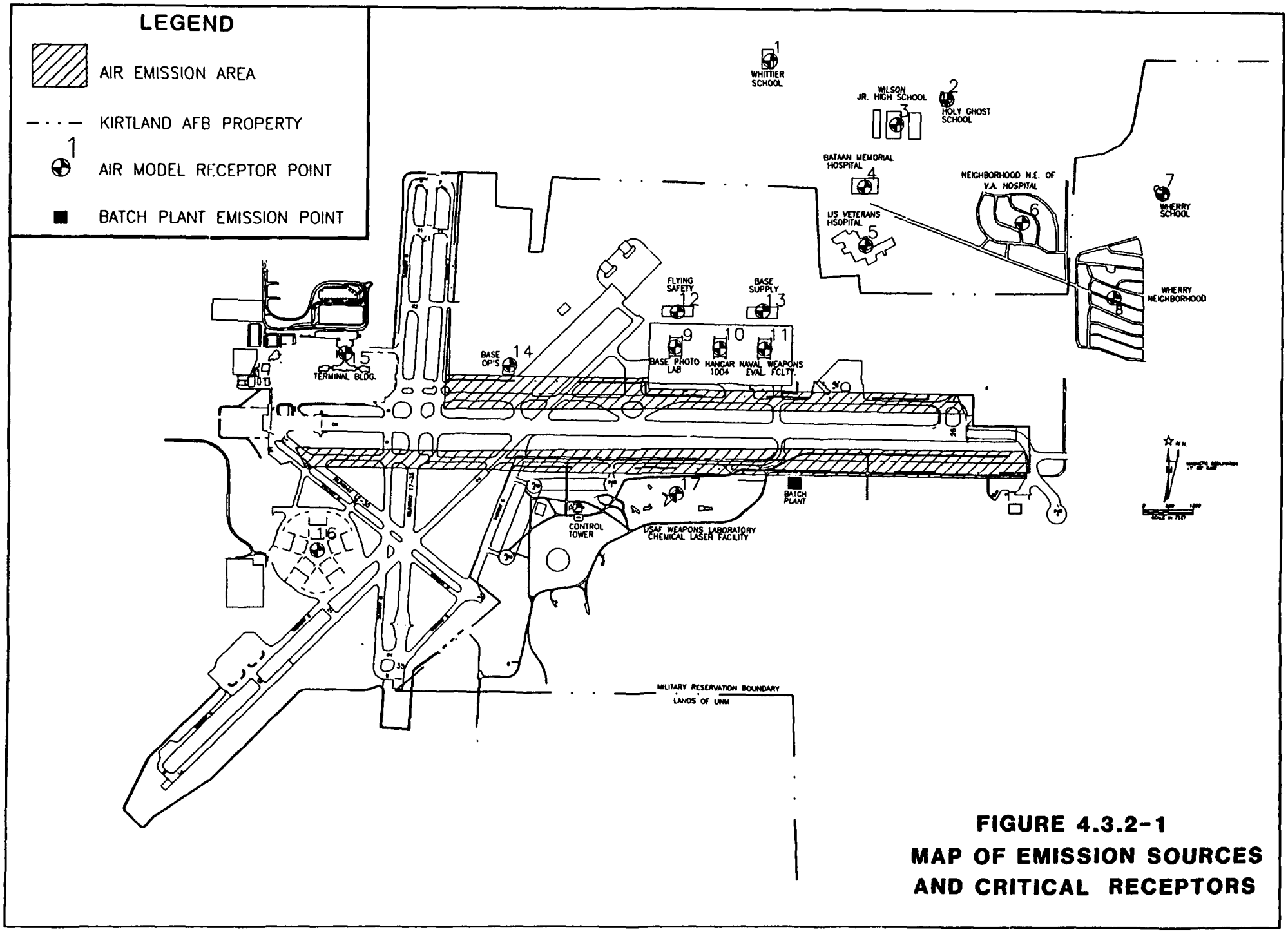


FIGURE 4.3.2-1
MAP OF EMISSION SOURCES AND CRITICAL RECEPTORS

Table 4.3.3-1 Highest Daily PM_{10} Air Quality Impacts
(using maximum hourly emission rates, all units in $\mu g/m^3$)

Receptor	Title	Batch Plant[1]	Batch Plant[2]	Taxi A&AA only	Taxi E only	Taxi A&AA + Batch[1]	Taxi E + Batch[1]	Taxi A&AA + Batch[2]	Taxi E + Batch[2]
Offsite receptors									
1	Whitter School	290.5	12.8	14.5	9.1	294.6	294.0	14.5	18.7
2	Holy Ghost School	183.7	8.1	15.5	10.9	188.8	187.9	15.5	14.2
3	Wilson Jr. High	227.2	10.0	18.6	11.8	236.5	235.0	18.6	17.8
4	Bataan Hospital	299.8	13.2	25.0	14.3	311.2	308.7	25.0	22.1
5	V.A. Hospital	366.4	16.1	27.5	19.3	389.0	381.2	27.5	31.0
6	Houses NE of V.A. Hospital	355.4	15.7	17.3	13.9	364.3	366.5	17.3	26.8
Onsite receptors									
7	Wherry School	242.0	10.7	9.2	8.7	248.0	248.6	9.2	17.2
8	Wherry Housing	365.8	16.1	27.1	15.0	375.3	373.5	27.1	23.8
9	Base photo lab	335.2	14.8	133.5	47.1	406.4	361.4	133.5	49.1
10	Hanger 1004	549.3	24.2	66.4	32.8	577.5	561.7	66.4	37.5
11	Naval Weapons Eval. Fac.	333.7	14.7	90.5	34.1	377.5	349.1	90.5	36.2
12	Flying safety	363.6	16.0	163.9	49.6	517.0	404.2	163.4	56.6
13	Base supply	577.3	25.4	135.0	48.8	688.0	618.0	135.0	66.2
14	Base Operations	348.8	15.4	122.8	34.7	388.4	358.3	122.8	35.2
15	AIA Terminal	410.9	18.1	114.1	53.4	525.0	438.8	114.1	53.4
16	Cargo Air Service	142.3	6.3	17.9	39.2	143.8	148.1	17.9	39.2
17	Chem. Weapons Research Plant	312.3	13.8	78.5	198.3	354.2	423.7	78.5	198.3

Note: Federal 24-hour average standard is 150 $\mu g/m^3$

[1] The asphalt batch plant emission rates are based on using a high-efficiency cyclone as the emission control device.

[2] The asphalt batch plant emission rates are based on using a wet, orifice or venturi scrubber as the emission control device.

Table 4.3.3-2 Annual PM_{10} Air Quality Impacts
(using annual emission rates, all units in $\mu g/m^3$)

Receptor	Title	Taxi A&AA only	Taxi A&AA +Batch*	Taxi E only	Taxi E +Batch*
Offsite receptors					
1	Whitter School	0.9	2.7	0.6	2.4
2	Holy Ghost School	0.9	1.9	0.7	1.7
3	Wilson Jr. High	1.1	2.6	0.8	2.3
4	Bataan Hospital	1.6	4.0	1.1	3.4
5	V.A. Hospital	2.2	4.8	1.5	4.0
6	Houses NE of V.A. Hospital	1.0	3.4	1.0	3.4
Onsite receptors					
7	Wherry School	0.5	1.6	0.5	1.7
8	Wherry Housing	0.8	2.5	0.9	2.7
9	Base photo lab	10.8	14.9	4.1	8.2
10	Hangar 1004	5.7	8.7	2.7	5.7
11	Naval Weapons Eval. Fac.	7.4	10.2	2.9	5.7
12	Flying safety	13.8	17.4	4.1	7.7
13	Base supply	11.4	14.0	4.1	6.7
14	Base Operations	7.7	10.9	2.6	5.8
15	AIA Terminal	2.4	3.9	3.2	4.7
16	Cargo Air Service	0.5	1.1	1.8	2.5
17	Chem. Weapons Research Plant	4.9	8.7	12.6	16.3

Note: Federal annual geometric mean standard is 50 $\mu g/m^3$.

* The asphalt batch plant emission rates are based on using a high-efficiency cyclone as the emission control device.

The cumulative impacts of other KAFB construction projects on ambient air quality must also be addressed. Several other construction projects are scheduled to overlap the construction schedule of Taxiways A and AA. These projects, listed in descending order of area of disturbance, are: the avionics shop and parking lot (40,000 square feet), corrosion control facility (24,000 square feet); field training facility (19,250 square feet); aerial delivery facility (13,000 square feet); the telecommunication center (9,000 square feet), and the resurfacing of Apron E. As previously discussed, the Apron E project is scheduled over a 5-year period. These construction projects will increase the amount of airborne particulate matter above the amounts projected for the taxiway reconstruction project. The impact from other pollutants are not anticipated to cause a significant problem. Although the impacts from concurrent projects have not been quantified, it is anticipated that mitigative measures prescribed for the taxiway reconstruction should also be employed for these other construction projects, especially if they are located near sensitive receptors such as schools or hospitals.

4.4 NOISE

Noise sources include aircraft run-up, takeoff and landing, and construction activities. The most significant noise impact for on-base receptors will result from the temporary use of Runway 17-35 during the shutdown of Runway 8-26. During a continuous 4-month shutdown of Runway 8-26, Runway 17-35 is will carry air traffic from larger commercial and military aircraft than currently handled. Table 4.4-1 shows the anticipated mix of aircraft expected to use Runway 17-35 while Runway 8-26 is temporarily closed. Aircraft are expected to take off to the south from Runway 17 approximately 85 percent of the time. Impacts to sensitive receptors are further discussed in section 4.4.2, operation impacts.

4.4.1 Construction Impacts

Noise impacts from construction activities at the project site are a function of the noise generated by construction equipment, the location and sensitivity of nearby land use, and the timing and duration of the noise-generating activities.

Although construction noise is limited in duration for a given project, adverse impacts due to construction noise are common. Heavy earth-moving and construction equipment are a recognized noise source with potential adverse impacts to sensitive receptors (see table 4.4.1-1). To assess potential impacts from construction noise, the procedures and guidelines of the Construction Engineering Research Laboratory (CERL, 1978) have been utilized.

Normally, construction activities are carried out in stages, each of which has its own mix of equipment and noise characteristics. The maximum construction noise is expected to be generated during demolition of existing pavements and the earth-moving stages. A typical mix of construction equipment has been identified for use at the various stages of construction. Proposed equipment and the allowable maximum and predicted noise levels are shown on table 4.4.1-1.

Table 4.4-1 Expected Runway Utilization at Albuquerque International Airport During Closure of Runway 08-26

Aircraft Category/ Operation	Utilization (%) Runway 08	Runway 26	Runway 17	Runway 35	Runway 03	Runway 21	Runway 30	Runway 12
MAC scheduled[a] (C-130H)	0	0	85	15	0	0	0	0
ANG scheduled[a,b] (A-7D, C-130H)	0	0	85	15	0	0	0	0
Navy scheduled								
A-7D and F-18[a]	0	0	85	15	0	0	0	0
Piper and Cheyenne								
Landings	0	0	3	7	35	0	35	20
Departures	0	0	10	5	0	35	25	25
Transients[a]	0	0	85	15	0	0	0	0
Civil nonscheduled								
Landings	0	0	15	10	35	0	35	5
Departures	0	0	20	10	0	35	10	25
Civil scheduled								
Landings	0	0	85	15	0	0	0	0
Departures	0	0	90	10	0	0	0	0
Aero Club (COMSEP[c])								
Landings	0	0	15	15	24	6	32	7
Departures	0	0	40	10	0	20	5	25
Civil Air Patrol (COMSEP[c])								
Landings	0	0	15	15	35	0	25	10
Departures	0	0	20	10	0	40	5	25
Cutter Air								
Misc. military[a]	0	0	85	15	0	0	0	0
CNA441								
Landings	0	0	15	15	32	0	24	14
Departures	0	0	20	7	0	35	14	24
U.S. Customs								
Miscellaneous military[a]	0	0	85	15	0	0	0	0
CNA500								
Landings	0	0	55	10	35	0	0	0
Departures	0	0	55	15	0	30	0	0
CNA441								
Landings	0	0	15	15	35	0	20	15
Departures	0	0	20	5	0	30	20	25

[a] Landings and departures.
[b] Existing and future (F-16s).
[c] COMSEP = single-engine propeller aircraft.
Source: USAF, 1990; Kamhoot, 1991e.

ES\AU27006\5T441

Table 4.4.1-1 Construction Equipment
Noise Level Limits at 50 Feet

Equipment Type[1]	Number Used	Allowed[2] dB(A)	Predicted[3] dB(A)
Bulldozers (track)	5	85	90
Front loaders (track)	3	75	75
Graders	4	75	75
Scrapers	5	80	80
Off-highway trucks	8	75	88
Wheeled loaders	4	75	75
Rollers	4	75	75
Crane	1	75	88
Pavers	2	80	80

[1] Estimates of the number of pieces of equipment to be used. These values represent the worst-case situation with construction at its peak during remodeling of Taxiways A and AA.

[2] These dB(A) limits cited by the U.S. General Services Administration have been established as required criteria for this project (Harris, 1979).

[3] Predicted levels based on data cited in CERL and EPA documents and the *Handbook of Noise Control*, second edition (Harris, 1979).

Source: Engineering-Science.

At 50 feet, during normal operating conditions, noise emissions from the equipment to be employed at the site should not exceed the allowed levels indicated on table 4.4.1-1. These limits have been established for construction vehicles at all federal government structure sites (GSA, 1975) and are appropriate for this project. All contractors working at the airport construction site should comply with these regulations.

Table 4.4.1-1 also gives predicted noise levels at 50 feet for each equipment type. These data are based on numerous noise measurements by others and are cited in CERL and EPA documents. In the event the particular equipment chosen for the project does not comply with the allowed limits in table 4.4.1-1, or if such equipment generates noise in excess of 75 dB(A) at 50 feet, the contractor must provide temporary barriers or other appropriate noise suppression measures having sufficient attenuation characteristics to sufficiently reduce the intruding noise at the airport property line and at all affected sensitive receptors on base.

Based on these estimates, demolition and earth-moving construction noise at the nearest sensitive receptor sites will be well below the normal noise levels created by aircraft operations (figure 3.4.1-2). Therefore, no significant impacts to the surrounding environment are expected.

4.4.2 Operation Impacts

Major noise sources will be aircraft takeoff noise and construction vehicle noise. Some sensitive receptors on base currently not affected will experience high noise levels. These noise levels will interrupt sleep, interfere with conversation, and tend to increase stress in sensitive individuals (Harris, 1979). It is expected also that a portion of Albuquerque will fall inside the L_{dn} contour of 65 dB(A) including sensitive receptors such as schools, hospitals, churches, and residential communities.

The FAA Integrated Noise Model (INM) was used to generate a 65 dB(A) L_{dn} contour for aircraft noise during the construction period when Runway 17-35 will be used. Runway utilization percentages shown on table 4.4-1 and the average number of daily aircraft operations shown on table 3.2.1-1 were used to generate the 65 dB(A) L_{dn} contour shown in figure 4.4.2-1. As shown is table 4.4-1, the larger commercial and military aircraft are expected to take off to the south on Runway 17. The same number of aircraft and flight tracks used for the Part 150 study (AIA, 1989) to generate the 1988 baseline noise contours were also used in this EA. Military touch-and-go operations were not included in the analysis.

Table 4.4.2-1 shows noise levels for existing baseline conditions for base sensitive receptors and during the construction period when Runway 17-35 will be used. Construction period noise levels were predicted at sensitive receptors using the special grid calculation option of the INM.

During the anticipated 4-month shutdown period of Runway 8-26 when aircraft operations will increase on Runway 17-35, there will be a noise impact reduction for a large segment of base facilities that are presently affected (see table 4.4.2-1). Approximately 3,600 base personnel are estimated to fall within the 65 dB(A) L_{dn} under existing conditions as compared to about 2,450 people when Runway 17-35

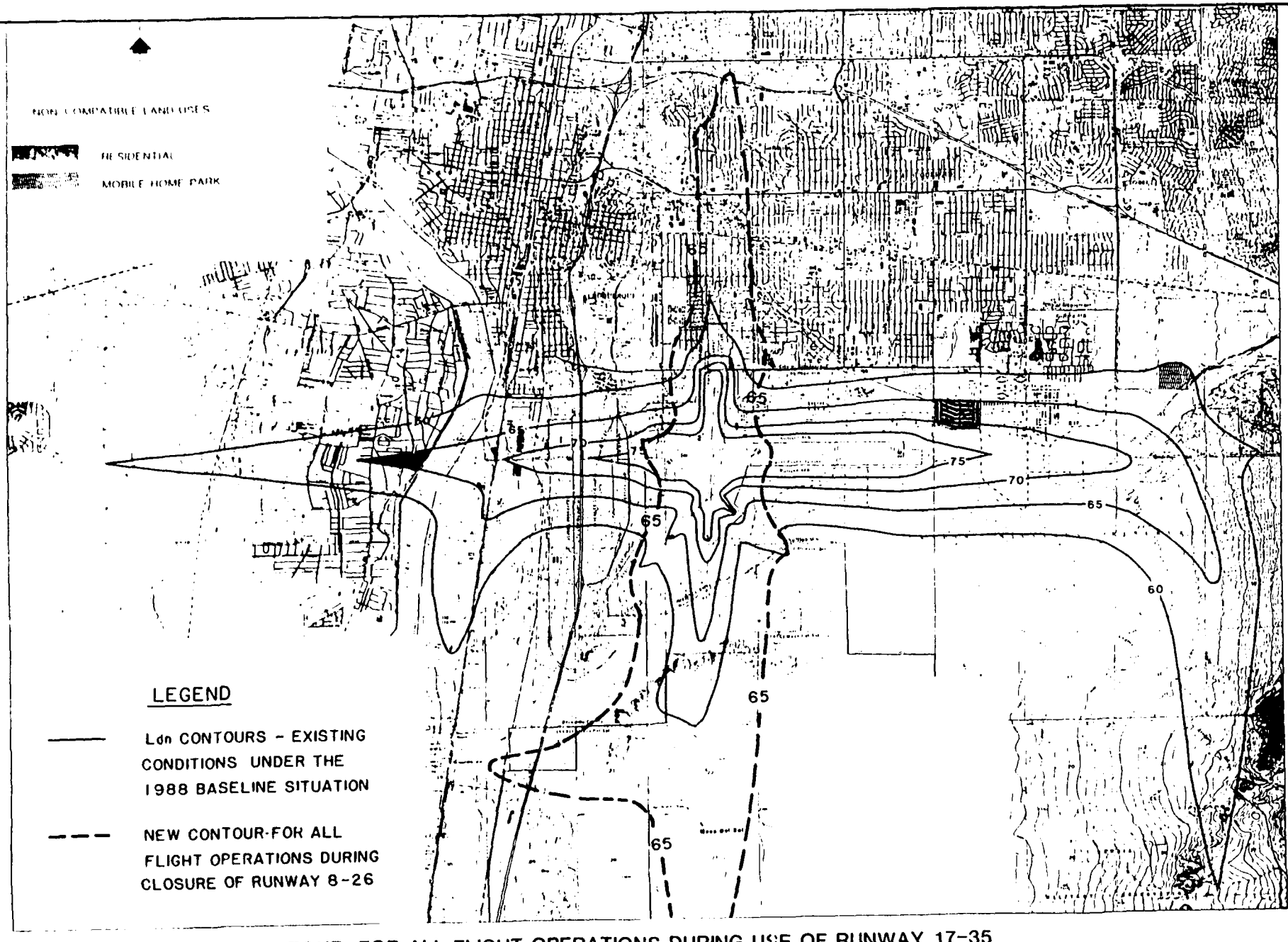


FIGURE 4.4.2-1 65 Ldn CONTOUR FOR ALL FLIGHT OPERATIONS DURING USE OF RUNWAY 17-35

Table 4.4.2-1 Predicted Noise Exposure for Kirtland AFB
On-Base Sensitive Receptors During Use of Runway 17-35

Sensitive Receptor	L_{dn}, dB(A)*	
	Existing Conditions	Construction Period
1. Veterans Administration Hospital	60	49
2. Family housing - Wherry Neighborhood	65	41
3. Public school	60	42
4. Dorms - military	65	39
5. Correction facility - military	70	38
6. Hospital	55	39
7. Chapel	55	39
8. Technical library	60	73
9. Family housing - enlisted personnel	60-65	74
10. Youth center	60	79
11. Public school	60	71
12. Guest housing	60	69
13. Church	55	62
14. Officers club	55	62
15. Dorms - military	55	53
16. Flight training	60	55

* L_{dn} = day and night loudness levels.
Source: AIA, 1989, and Engineering-Science.

will be used. However, there will be a significant increase in noise levels to a different, large group of sensitive receptors. The receptors that fall within the new 65 dB(A) or greater L_{dn} contour include the technical library, a different group of family housing (enlisted personnel), youth center, public school, and guest housing. At this level of noise, all activities (including sleep) at these sensitive receptor locations would be interrupted. Normal building construction practices would not be sufficient to attenuate these sounds to an acceptable indoor level.

Sleep disturbance is a major factor in annoyance related to aircraft noise exposure. Air Force procedures (Pearsons, 1989) were analyzed to predict the number of people that will be awakened due to aircraft takeoff and landing. These procedures are based on the SEL values (see figure 3.4.4-1) at specific locations. The INM was used to predict the outdoor SEL from aircraft operations at base residential locations. Table 4.4.2-2 presents the number of people that will be awakened due to aircraft operations during the construction period when Runway 17-35 will be used. These predictions are based on average noise level reductions of 15 dB for a moderate climate residence with the windows open. It is estimated that a total of 1620 base personnel will be exposed to noise levels greater than 80 dB from aircraft departing on Runway 17-35. Of this amount, approximately 500 people will experience sleep disturbance. The estimated total amount of people exposed to these noise levels from aircraft arriving on Runway 35 is about 81. Approximately 15 of this people will experience sleep disturbance. None are expected to experience sleep disturbance from aircraft arriving on Runway 17.

There is a significant variation in the SEL values for individual operations and predictions of the number of people awakened. It must also be noted that these figures are for single operations only and do not provide estimates of the total number of people who might be awakened during a single night or the number of people awakened by more than one operation.

4.4.3 Cumulative Impacts

4.4.3.1 Construction

Construction noise from the proposed project will occur during the same time frame as demolition and reconstruction of Apron E in the hanger area. Construction activities associated with Apron E will occur over a 5-year period, so that 20 percent of that project can be expected to be carried out annually. As a result, additional noise impacts from construction and vehicular traffic can be expected. Given the distances involved, there will be no significant noise impact increase at sensitive receptor locations as a result of the proposed increased construction operations. Likewise, the expected increase in vehicular traffic will not increase the L_{eq} more than 5 dB(A); consequently, there will be no significant traffic noise impacts.

4.4.3.2 Operations After Construction

Noise levels contours will revert to existing conditions after construction is complete. Additional flights by both military and commercial airlines are likely to

Table 4.4.2-2 Probable Awakenings from Aircraft Operations on Kirtland AFB

Outdoor SEL Range	Percent Awakened Indoors*	Departure on Runway 17		Departure on Runway 35	
		Estimated Number of People Exposed	Estimated Number of People Awakened	Estimated Number of People Exposed	Estimated Number of People Awakened
80-85	18	--	--	--	--
85-90	23	772	179	772	179
90-95	29	253	74	253	74
95-100	36	313	113	447	162
100-105	44	201	89	67	30
105-110	54	--	--	81	44
110-115	65	81	52	--	--
Totals		1,620	507	1,620	489

Outdoor SEL Range	Percent Awakened Indoors*	Arrival on Runway 17		Arrival on Runway 35	
		Estimated Number of People Exposed	Estimated Number of People Awakened	Estimated Number of People Exposed	Estimated Number of People Awakened
80-85	15	--	--	31	15
85-90	23	--	--	--	--
90-95	29	--	--	--	74
95-100	36	--	--	--	162
100-105	44	--	--	--	30
105-110	54	--	--	--	44
Totals				81	15

* Based on sleep disturbance values shown on figure 3.4.4-1.

occur (Molzen-Corbin, 1990); therefore, both the size of area impacted and the level of noise at sensitive receptors may ultimately increase.

The NMANG is considering replacing their A-7D aircraft with F-16 aircraft at KAFB. F-16 aircraft are quieter than A-7D aircraft. Table 4.4.3.2-1 shows landing and takeoff noise levels for both aircraft. However, for this noise analysis, A-7D aircraft were used.

4.5 WATER RESOURCES

4.5.1 Surface Water and Drainage

Potential short-term impacts of the taxiway extension and drainage modification project on surface water have been identified for two project stages: construction activities, and operation of the upgraded facilities.

4.5.1.1 Construction Activities

Sediment transport. A increased amount of sediments transported by the drainage system and arroyos is expected as a result of construction activities. Excavation and grading will cause destabilization of soils, which can then be eroded by wind and rainstorms.

The impact from excavation and grading is not expected to be significant because the contractor will be required to follow erosion control measures specified in construction drawings and NPDES permits. Furthermore, exposed soils at the construction sites are to a large extent unconsolidated, since the scattered vegetation plays a small role in soil retention. In the case of Taxiway E, erosion control measures could reduce the ongoing loss of soil.

Any potential increased soil transfer from the mesa to arroyos due to construction activities is negligible when compared to the amount of soils transported by rain and wind from hundreds of acres of unconsolidated soils in the vicinity of the airport site. Erosion control measurements initiated during construction could actually reduce the loss of soils currently taking place.

Drainage improvements. Removal of vegetation and construction waste debris to improve flow in the Control Tower drainage ditch will destabilize the ditch walls, increasing the risk of erosion. This risk increases if construction activities take place during the summer, when heavy precipitation can be expected.

Reshaping the Control Tower drainage ditch and building the proposed sediment retention basin will also require rerouting runoff to an alternative drainage system. The rerouted storm water could cause some additional erosion along the airport mesa during construction.

The potential erosion increase along the ditch can be minimized by limiting removal of vegetation to the minimum required and by not conducting construction activities during the area's rainy season (summer).

Storm water contamination. Precipitation on the construction sites could come in contact with contaminated soils or spilled contaminants. Contaminated soils could be present near potentially leaking abandoned underground fuel lines. In the

Table 4.4.3.2-1 Predicted Kirtland Air Force Base Military Aircraft Noise Levels

Military Designation	Civilian Equivalent[b]	Noise Levels[a] (approach/takeoff)
A-7D	B 707	84/94
F-16**	Learjet 35	82-83/66-72

[a] Conversion from military to civilian equivalent per FAA Advisory Circular 36 and NOISEMAP Program Manual.

[b] 6,500 meters from start of roll for takeoff and 2,000 meters from the runway threshold for approach.

Source: FAA Advisory Circular 36.

case of Taxiway E, the specific locations of some buried fuel lines are not known, and the risk of finding contaminated soils exists. Construction plans for the taxiway improvement project will include provisions for excavation and disposal of contaminated soils by a qualified contractor if such soils are found during construction (Richardson, 1991). Finding leaking fuel lines or contaminated soils may delay construction activities for the period required to assess the extent of contamination, identify the required action, and implement remediation.

4.5.1.2 Operation

Erosion. It is expected that the taxiway and drainage improvement project will reduce soil erosion since areas covered with unconsolidated sands will be paved and the erosion processes will be controlled at the storm water outfalls of the Control Tower and Landfill 1 drain systems.

Along the drain ditch of the Control Tower drainage system, erosion is expected to gradually decrease as ditch walls revegetate and soils consolidate. Downstream of Kirtland Road, erosion of the receiving arroyo will not increase despite the expected increase in runoff volume because the storm water retention basin will restrict the maximum potential discharge rate to the peak values currently present in the Control Tower drain system. Drainage improvements are expected to increase the peak capacity of the Control Tower drain system from 140 cfs to 431 cfs (Molzen-Corbin, 1990). Use of the basin will extend the runoff retention period from minutes to several hours, but no significant impacts are anticipated other than a vegetation increase around the basin edge. Accumulation of sediments in the retention basin might require regular disposal of collected sediments to maintain the pond's runoff storage capacity.

Water quality. Water quality in the arroyo which transects Landfill 1 will not change as a result of the proposed project. No major changes in the Control Tower drainage system runoff are foreseen. The reduced ponding on Taxiways A and AA, and Apron B will reduce the risk of runoff contaminated by spilled fuels and aircraft washdown.

4.5.2 Groundwater

4.5.2.1 Quantity

A decrease in storm water percolation at the airport site is expected since undeveloped areas will be paved, and runoff ponding will be greatly reduced as a result of the drainage improvement project. Percolation will take place off the airport mesa, most likely occurring at the proposed storm water retention basin. This impact is not considered significant because of the small flow involved, and because the recharge area of the Santa Fe aquifer is far removed from the airport site.

4.5.2.2 Quality

No significant impacts from the project on groundwater quality are expected. Groundwater used as a source of potable water is obtained from a deep aquifer whose static levels at the construction sites are found at depths greater than 300 feet.

4.5.3 Cumulative Impacts

As previously discussed, other construction projects will be conducted in the near future at KAFB. These projects will involve rearrangement and/or construction of some installations in the military operations area north of Runway 8-26 near Taxiways A and AA. Construction of the new installations is not expected to have a cumulative effect on water resources impacted by the taxiway improvement project because development of some of the projects will only partially overlap, and the new facilities are relatively small.

The project to construct an impervious liner of concrete or concrete sewer pipe in the arroyo which transects Landfill 1 would not have a cumulative effect on the proposed project since the arroyo is not located within the construction area of Taxiway E.

4.6 BIOLOGICAL RESOURCES

4.6.1 Terrestrial Biota

Minimum impacts on vegetation and wildlife are expected due to construction of Taxiways A, AA, and E. Construction activities will take place in well-developed areas of the base which are substantially altered from their natural state and provide only marginal quality wildlife habitat. Displaced species typical of urban environments are commonly present in extensive lawns and other developed areas within the base perimeter.

Desert grassland areas will be cleared and graded for extension of Taxiway E, improvement of the drainage system, and possible construction of a Base Operations building and associated facilities. Additional vegetated areas adjacent to the construction sites might also be temporarily disturbed by construction equipment traffic and use as construction laydown areas. The proposed project will result in a loss of about 20 acres of semidisturbed desert grassland habitat. This area represents only a small portion of the 38,000 acres of unimproved land and 2,750 acres of semi-improved lands estimated to be present at the base (USAF, ND). Unimproved lands offer a higher quality habitat for wildlife support than those areas subject to construction. Part of the disturbed area is expected to revert to grassland once project construction is completed.

Desert grassland populations in the area will not be threatened by the proposed construction project because of the small area affected and the fact that lost habitats are not critical or unique for any wildlife species in the area.

Removal of the vegetation associated with the channel collecting storm water from the base central drainage basin, just west of the Control Tower, will modify a biological resource of some significance within the immediate area. Clearing the vegetation will be required to upsize the channel and culverts, place additional storm water drainage pipes, and construct a storm water retention basin in the drainage area south of the Control Tower. The channel supports a relatively dense vegetation which provides a habitat for some wildlife species. This habitat is not significant in terms of coverage (less than 2 acres) but because of its scarcity in the

area. The impact of channel construction will be temporary since the upgraded channel margins are likely to develop vegetation similar to that currently present. Additional vegetation could also be supported by ground moisture retained during the temporarily impoundment of storm water in the proposed retention basin.

Increased noise and human activity due to construction could temporarily displace some wildlife species. However, no significant impact is expected since species present in the project area are already subject to such annoyances and likely to be acclimated to the disturbances.

4.6.2 Threatened, Endangered, and Special Status Species

All areas of potential disturbance due to construction activity were surveyed on 11 April 1991. It was determined from the survey and information obtained from the USFWS and the New Mexico Department of Game and Fish that the presence of federally listed endangered species in construction areas adjacent to the airfield and drainage areas is unlikely (Culley, 1991; Svensky, 1991; State of New Mexico, 1991). None of the four animal species which could be present within a 50-mile radius of KAFB (bald eagle, peregrine falcon, whooping crane, and black-footed ferret) are known to occur in the proposed project areas, and their preferred habitats are not available near the construction sites.

Of four species of special concern, only the black gramma cactus occurs on KAFB in the vicinity of the project area. This cactus is also a category 2 candidate species for inclusion in the USFWS list of endangered species. Available information on three other listed species, the Mexican spotted owl, lightweight visnegite, and Wright pincushion cactus, indicates that these are not likely to exist in the vicinity of the project area. No stands of black gramma cactus were observed during a biological walkover in the project area. It is unlikely that stands of this species would colonize the area since the airfield is maintained by mowing at least twice a year.

4.6.3 Cumulative Impacts

The construction of new installations in the military operations area north of Runway 8-26 will be conducted in a completely developed area near Taxiways A and AA, where no significant biological resources are present. Consequently, the taxiway improvement project and the military operations area rearrangement project will not have a cumulative effect on biological resources.

4.7 CULTURAL RESOURCES

4.7.1 Archaeological Resources

The proposed construction of Taxiways A, AA, and E will have no impact on archaeological resources. When the runways and taxiways were first constructed, the original ground surface was graded and seriously modified by construction activities. The runways and taxiways are also underlaid by utility conduits and storm drains. The taxiways have been modified and rehabilitated several times.

Other proposed work consists of upgrading drainage systems near Kirtland Road. Upgrading the taxiways and the drainage system may increase flow to the arroyos unless mitigative measures are taken.

One arroyo is adjacent to Landfill 1. Upgrading the storm drainage system will not significantly affect the storm water flow in the area of this landfill. However, under present conditions, storm water will continue to erode the sides of the arroyo. No archaeological work is possible in the area containing the sanitary landfill (east side of Landfill 1) since this area has been disturbed and materials were dumped and filled over the area. However, if the landfill or drainage south of Kirtland Road are modified by construction or potential erosion, it is possible that the natural pediment surfaces downstream from the Atchison and Santa Fe Railroad may be affected.

During the initial field visit for this project, a walkover was conducted on the banks of the arroyo and western drainage area, south of the Control Tower. During the preliminary walkover, stone artifacts were observed on the banks of the arroyo, indicating the potential for archaeological resources. The ground surfaces downstream of Kirtland Road consisted of undisturbed pediment surfaces, except for the presence of construction waste in the arroyo near the Jet Propulsion Lab. If this drainage area is modified by construction activities, or if there is increased flow into this drainage channel, it is possible that ground lateral bank surfaces will be affected by construction or by indirect impacts such as erosion. However, under current construction plans, downstream erosion will be kept to a minimum since the flow will be controlled by the construction of a retention basin north of Kirtland Road. The Historic Preservation Division of the State of New Mexico has indicated that an archaeological survey will not be required unless the project results in an increased output of waterflow into the arroyos south of the landfill 1 or Kirtland Road near the Control Tower (appendix A).

4.7.2 Historical Resources

Planned construction activities will have no impact on the four standing structures of historical significance on KAFB.

4.7.3 Cumulative Impacts

Construction of two road corridors through KAFB have been proposed. The proposed corridors, Gibson Boulevard and Rio Bravo Boulevard, are planned to begin just east of the Rio Bravo/I-25 Interchange, continue in an east-northeast direction through KAFB, and terminate at either San Mateo Boulevard or Louisiana Boulevard. The road corridor project area mainly consists of arid desert grassland region on mesa tops, eroded hillsides, and level floodplains. The environmental concerns identified in the project area consist of possible impacts on historic and prehistoric sites. During the initial assessment, prehistoric sites and historic dumps were identified (Scanlon & Associates, Inc. 1990).

The Environmental Impact Statement (EIS) for this proposed road is being formulated. It is expected that the environmental study will take approximately 18 months. There have been no archaeological surveys of the project area, and a

comprehensive survey was recommended (Scanlon & Associates, Inc. 1990). If the project is approved, road construction will probably begin in the mid-1990s. Cumulative impacts from the construction of these projects would not have any effect on the proposed action.

4.8 SOCIOECONOMICS

4.8.1 Population and Housing

It is estimated that fifty-two construction workers will be employed during construction of Taxiway E, and as many as ninety workers employed during the construction of Taxiways A and AA. Construction workers will probably be drawn from the regional and local civilian labor pool. Hence, no population or housing impacts are anticipated. Since the project is likely to draw on the local or regional construction labor force, no public service impacts are expected from any population movement and growth such as additional demands on schools, water services, police services, fire protection, health care, and recreational facilities.

4.8.2 Employment and Economic Activity

Construction of Taxiway E is expected to last 18 months and cost $18,629,332. The construction work period is expected to be one 10-hour shift, 6 days per week (Molzen-Corbin, 1990). Construction of Taxiway A and Taxiway AA is expected to cost $30,000,000 and also last 18 months. These figures do not include the cost of moving Base Operations. The project is not expected increase civilian or military operational employment or annual operational expenditures at KAFB or AIA.

The total construction-related expenditure of over $48,000,000 is likely to generate induced (household spending) and secondary (inter-industry) economic effects on industrial output. Given the large number of military and civilians currently employed at KAFB, the substantial annual construction and operational expenditures at KAFB ($1,209,338,055 in fiscal year 1990), and the relatively large population of Bernalillo County, the capital expenditures related to this project, along with associated direct and indirect employment generated in the region, can be expected to have only a small beneficial impact on the economy. Construction activities associated with the proposed project will have some direct and indirect short-term economic benefits to the area. Direct benefits are employment and local purchase of building supplies. Indirect economic impacts are purchasing of construction equipment and materials within the region and spending effects from paid construction wages and other directly related businesses.

Since an increase in KAFB operational expenditures or employment is not anticipated, there will be no long-term economic impacts on the level of industrial production (or output) and associated induced long-term socioeconomic impacts. The proposed project will enable the airport to accommodate the expected growth in commercial air traffic and enhance airport capabilities for handling military traffic. This may produce some positive long-term economic benefits associated with business activities and tourism.

No economic or socioeconomic impacts are expected from the possible closure of Runway 8-26 for periods totaling 4 months since the base does not charge a landing fee. No curtailment of commercial flights is anticipated; hence, impacts on commercial activities and tourism at the international airport are not anticipated.

Construction of Taxiway AA will necessitate relocating Base Operations from its existing location along Apron A. Base Operations consists of offices and vehicular and aircraft parking. The Air Force is considering four alternatives, each requiring some modifications and construction work except for Hangar 1002, which will require only minor remodeling. The impact associated with relocation of Base Operations will depend on the duration of construction, number of people employed, and construction expenditures. These additional activities will have some positive economic benefits to the region. Therefore, the proposed relocation of Base Operations will not impact government tenants.

4.8.3 Cumulative Impacts

Six other projects near Apron E will be under construction or just completed by the time the Taxiway A and AA are complete. Five of the projects involve constructing new facilities ranging in size from 9,000 to 40,000 square feet. A project to demolish and reconstruct Apron E is also scheduled to begin about the same time as the proposed project. Cumulative socioeconomics impacts resulting from these projects and the proposed project are not expected to be significant since changes in the workforce are not expected.

Other than functional designations, the proposed action is not expected to result in a change to any land use designation. These additional construction activities will result in some positive economic benefit to the region.

4.9 TRANSPORTATION

4.9.1 Construction Impacts

During construction of the proposed project, the road system surrounding the base will experience a slight increase in vehicular traffic from construction personnel commuting to the site. Heavy equipment such as bulldozers, dump trucks, and other earth-moving and construction equipment will also traverse the road system during working hours.

Sprecker Road (South gate) and Kirtland Road are expected to receive the majority of construction-related traffic. During construction of Taxiway E and connecting taxiways, approximately fifty personal vehicles and twenty-five mixed heavy and light equipment vehicles are expected on the road daily. These values are expected to increase almost 50 percent during work on Taxiways A and AA. This traffic will be in addition to the 600 vehicles using the Sprecker gate each day.

Construction and personal vehicles will be parked in designated areas along the south side of Kirtland Road within the base and should not present any interference to Base Operations. Heavy equipment will be confined to those areas actively under construction. Base roads to be used by construction-related traffic will be agreed

upon between the contractor and KAFB to minimize impact of construction on Base Operations.

4.9.2 Cumulative Impacts

The City of Albuquerque and Bernalillo County are proposing two projects to relieve present and future traffic problems in the metropolitan Albuquerque area. These projects will be evaluated in an Air Force EIS. The projects are the Gibson Boulevard East Traffic Corridor and the Rio Bravo East Traffic Corridor.

The Gibson project is not anticipated to have any cumulative traffic effects during the proposed action since it would not start until sometime in the mid- to late-1990s. Also, the Gibson project would involve areas to the north and east of the proposed project.

The Rio Bravo East Traffic Corridor would originate at the Rio Bravo/I-25 interchange and follow an easterly course. The corridor would enter KAFB south of Runway 8-26 and parallel the existing railroad through an explosive storage area and end at Gibson Boulevard. It is expected that the EIS for the Rio Bravo project will be completed about the same time as Taxiways A and AA are being constructed. If the Rio Bravo Corridor project is performed, then it could conceivably overlap with construction of Taxiways A and AA and increase vehicular congestion along the south portion of KAFB.

4.10 ENVIRONMENTAL MANAGEMENT

4.10.1 Sanitary Waste

The taxiway improvement project will increase sanitary wastes at KAFB due to the presence of construction workers. The impact of the increased sanitary waste will be minimal, since portable chemical toilets will be used by the construction crew. Waste will be disposed of at a permitted facility by a selected contractor.

4.10.2 Industrial Waste

Two types of waste will be generated by construction activities: asphalt and concrete pavement and unusable subgrade material, and petroleum fuels.

Approximately 40,000 cubic yards of asphalt and concrete will be removed from the existing taxiways during construction. It is expected that most of the asphalt will be recycled at the asphalt batch plant. Unusable subgrade material could amount to 6,000 cubic yards, or 10 percent of the estimated total excavation. Approved waste materials will be disposed of at one of the landfills on base, or any other approved areas.

Vehicle operation at the construction site will generate spent oils, posing the risk of contamination by spills at the selected fuel handling site. The risk of soil contamination during the taxiway extension project will be small since construction plans will specify spill containment structures surrounding the fuel handling area, and use of sound operating practices will minimize potential fuel spills and uncontrolled disposal of spent oils.

4.10.3 Installation Restoration Program

Landfill 1 is the only site identified by the KAFB IRP that could be affected by the taxiway extension project. The landfill has been proposed as one of the alternatives for disposal of construction waste. The impact of construction waste disposal is not considered significant since the landfill already contains construction waste and the waste is relatively inert.

4.10.4 Cumulative Impacts

The future rearrangement of the military operations area north of Runway 8-26 and the taxiway improvement project are not expected to have a cumulative effect on waste management. Sanitary and solid wastes will be handled independently for each project. The on-base landfills have adequate capacity for disposal of construction wastes generated by the two projects.

SECTION 5

REGULATORY REVIEW AND PERMIT REQUIREMENTS

This section presents an overview of the environmental regulatory and permit requirements that may be applicable to the proposed project. Environmental permit requirements were identified from an evaluation of federal, state, and local laws and regulations applicable to construction and operations associated with the proposed action.

Permit applications may require interagency consultation. Provisions of regulations may be jointly administered by federal, state, or local agencies. The time required to process permit applications, permit application fees, and the number of copies of applications that must be submitted are included in a separate document entitled "Permits Plan for the Repair and Extension of Taxiways A, AA, and E, Kirtland Air Force Base, New Mexico."

5.1 AIR QUALITY

The air pollution control program in Bernalillo County and the City of Albuquerque is administered and enforced by the Albuquerque-Bernalillo County Air Quality Control Board. The administrative agency under the AQCB for air quality is the Albuquerque Department of Environmental Health, Air Pollution Control Division. The AQCB regulates air quality under the "Ambient Air Quality Standards and Air Quality Control Regulations for Albuquerque/Bernalillo County." These standards were adopted to establish a level of air quality designed to protect human health, animal and plant life, and property; prevent interference with public welfare; and safeguard against further degradation of air quality in the county.

The AQCB requires authority-to-construct permits for proposed facilities which can be expected to be a source of air pollution. The purpose of the permit program is to ensure that new or existing facilities will not emit air pollution that will cause violations of air control regulations.

Air pollutants will be emitted during the repair and extension of Taxiways A, AA, and E. Significant sources of pollution will be the demolition and reconstruction of the taxiways and the asphalt batch plant, if required. Therefore, these activities are subject to review and permitting by the AQCB. There is a strong possibility that asphalt will be transported to the site from an existing permanent asphalt batch plant, in which case a temporary batch plant located at AIA may not be needed.

The primary pollutant of concern from taxiway improvement and extension activities is particulate matter. The AQCB requires, under air quality control regulation (AQCR) 8 (airborne particulate matter), that any industrial or commercial activity take reasonable precautions to prevent particulate matter generated from such activity from becoming airborne. Furthermore, particulate matter may not be discharged in quantities which will cause injury, detriment, nuisance, or annoyance to the public. These requirements stipulate that no person may disturb, move or remove soil occupying more than 3/4 acre of surface area without applying for a soil disturbance permit. Under this permit, the permittee must employ mitigation measures to prevent the escape of airborne particulate matter which would cause an opacity greater than 10 percent above the surrounding airborne background particulate matter against which the emission is measured. Mitigation measures may include such actions as daily watering of disturbed areas, daily cleanup of the construction site, termination of activities during high wind conditions, and revegetation of disturbed areas. Mitigation measures are designed to address the short-term, mid-term and long-term particulate emissions concerns of the project.

Since Bernalillo County is a nonattainment area for carbon monoxide, any source which emits CO and locates in the county must be permitted under AQCR 20 (authority-to-construct permits) and AQCR 32 (construction permits, nonattainment areas). AQCR 20 is the basic permitting regulation under which the owner of a source must apply for and receive an authority-to-construct permit before constructing new facilities or modifying existing facilities. AQCR 32 applies to sources locating in nonattainment areas or areas where ambient air quality standards are exceeded. AQCR 32 applies additional permitting requirements to the source to ensure further progress towards achievement of air quality standards.

If a portable asphalt batch plant is used to supply asphalt for the taxiway repair and extension project and is located at AIA, it must be permitted under AQCRs 20 and 32. However, a portable asphalt plant is considered a temporary source under AQCRs and, as such, can be exempted from the emission reduction and emission offset requirements of AQCR 32 if operation is limited to no more than one year. This exemption can significantly reduce time and cost in obtaining the authority-to-construct permit.

Once the AQCR receives an authority-to-construct permit application, they review the application for completeness within 30 days. Formal action on the permit – granting or denial – will be taken within 120 days (180 days if a public hearing has been called) from the date the application was deemed complete. The source emission capability is normally determined from manufacturer's specifications, prior source emissions testing, or published EPA emission factors. If a permit application is made solely for the purpose of moving a previously permitted source, then a transfer fee of $25 is all that is required. Application must be made on the "Application for Air Quality Permit and Certificate of Registration for Asphalt Plants located with Bernalillo County." Applications for the soil disturbance permit must be made on the "Topsoil Disturbance Permit Application." Once a complete permit application has been submitted, the AQCB will grant or deny the permit within 10 days of receipt. There is no fee to file this permit.

5.2 WATER QUALITY

The EPA regulates storm water management under 40 CFR 122. These regulations require a NPDES permit for construction activities exceeding five acres. Activities involving clearing, grading, and excavation must be permitted for sedimentation and erosion control. Activities scheduled for commencement prior to 18 November 1991, will require an application submitted for approval 90 days prior to commencement of construction. Activities scheduled for commencement after 18 November 1991 are expected to be governed by a general permit issued by EPA. It is expected that the construction permit application will require a notification of intent (NOI). The New Mexico Environmental Improvements Department would review necessary permits prior to filing applications with EPA region VI (Mulligan, 1991).

The proposed retention basin will require an NPDES permit if water is discharged from the structure. A recent engineering report indicates that the proposed basin will discharge approximately the same amount of water (100 cubic feet per second) into the arroyo as does the current outfall (Molzen-Corbin, 1990).

5.3 WASTE MANAGEMENT

5.3.1 Sewage Treatment

No sanitary wastewater generation is expected from the construction or operation phases of the proposed project; therefore, a permit will not be required.

5.3.2 Industrial Wastewater

No industrial wastewater generation is expected from the construction or operational phases of the proposed project. Therefore, a permit will not be required.

5.3.3 Hazardous Waste

Hazardous waste is not expected to be generated during the construction or operational phases of the proposed project; therefore, a permit will not be required.

5.4 THREATENED AND ENDANGERED SPECIES

The federal Endangered Species Act (ESA) of 1973, as amended, extends legal protection to plants and animals listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS). Section 7(c) of the ESA authorizes the USFWS to review proposed major federal actions to assess potential impacts on listed species. In accordance with section 7(c) of the ESA, the Air Force, in consultation with the USFWS, must identify potential species in areas of concern. USFWS comments are contained in appendix B.

The USFWS in New Mexico was contacted on 6 May 1991 to obtain information on federally listed endangered species for the KAFB area. The information was evaluated for potential environmental impacts to protected species. Four animal species were identified and found not to occur in the proposed project areas since their preferred habitats do not exist in or near the construction areas. A cate-

gory 2 plant species, the gramma grass cactus, occurs locally on KAFB, but was not observed in the project area during a walkover on 11 April 1991.

5.5 NATIONAL HISTORIC PRESERVATION ACT

Section 106 of the National Historic Preservation Act of 1966, as amended, requires federal agencies to consult with the State Historic Preservation Officer (SHPO) and the federal Advisory Council on Historic Preservation (ACHP) if proposed undertakings will affect resources of state, local, or national significance. These resources are identified in the National Register of Historic Places (NRHP) and are maintained by the U.S. Secretary of Interior.

Through section 106, a public interest process is established in which the federal agency proposing an undertaking participates along with the SHPO, the ACHP, interested organizations, and individuals. The process is designed to ensure that properties, the impacts on them, and the effects to them are identified, and that alternatives to avoid or mitigate an adverse effect on property eligible for the NRHP are adequately considered in the planning process.

The construction areas proposed for this project have previously been subjected to extensive disturbance from past construction activities. However, if the construction plans call for alteration of the drainage system or increased output of water flow into the arroyos south of Landfill 1 or Kirtland Road near the Control Tower, a phase I archaeological survey will be required (see SHPO comments, appendix A). A phase I survey establishes the presence or absence of cultural resources. Assessment of archaeological resources should follow guidelines established by the National Park Service, the Advisory Council on Historic Preservation, and the New Mexico State Historic Preservation Office (36 CFR 800; 36 CFR 66).

SECTION 6

MITIGATION MEASURES

6.1 MISSION AND OPERATIONS

Impacts to mission and operations of tenant organizations using Hot Pad 1 as a result of construction activities for the proposed action are short term. Phillips Laboratory may need to share the use of Hot Pad 2 with Ross Aviation, but neither firm has a need for frequent use of the hot pad.

6.2 AIRCRAFT OPERATIONS

Impacts to aircraft operations as a result of construction activities for the proposed action are short term. The contractor and KAFB and AIA operations personnel must work to coordinate scheduling of construction activities. Also, FAA safety protocol must be followed by the contractor. Safety zone distances of at least 250 feet will be required between workers and jet aircraft. Runways and taxiways must constantly be cleaned of rocks, dirt, and other small debris while construction activity is performed near operational runways and taxiways.

Notifications to pilots will be sent by FAA to other airports regarding closures and potential delays at AIA and KAFB. This action will help relieve some of the congestion at AIA when Runway 8-26 is closed.

6.3 AIR QUALITY

The primary mitigative measure for controlling air quality impacts is a high-efficiency particulate emission control device for the portable asphalt batch plant. Common practice is to use a wet scrubbing system as the control device to reduce the anticipated air quality impacts. A less efficient control technology such as a cyclone system will probably result in significant exceedances of the federal and state PM_{10} and TSP air quality standards.

Mitigative measures for the control of fugitive dust from construction activities (equipment movement) should also be mandated. Especially high impacts are anticipated near the hangars north of Taxiways A and AA. If these or other nearby receptors need a low dust environment, then further mitigative measures may be necessary, such as water spraying disturbed areas more than twice a day. During hot, dry periods, this might be increased to water spraying every 2 or 3 hours. Chemical dust suppressants might also be a cost-effective alternative to frequent water spraying. The level of dust suppression should be based on project- and area-

specific conditions and experiences. The following dust control measures may be used:

- Use water trucks or sprinkler systems during clearing, grading, earth moving, or excavation.
- Treat disturbed areas after cleaning, grading, earth moving, or excavation is completed by watering, revegetating, or spreading soil binders until areas are paved or developed.
- Use water trucks or sprinkler systems to keep vehicle movement areas damp.
- Keep soil stockpiles moist, or treat with soil binders and cover.
- Terminate activities during high wind conditions.

No mitigative measures beyond maintaining well-tuned engines are suggested for controlling emissions from construction equipment engines.

6.4 NOISE

6.4.1 Construction Noise Mitigation

Mitigation measures will be required to minimize construction noise impacts to on-base and nearby off-base sensitive receptors. Especially sensitive receptors, both on base and in the local community, such as hospitals, schools, convalescent homes, and residences that fall within the L_{dn} contour of 65 dB(A), will need implementation of noise mitigation measures to reduce interior noise.

Short-term impacts can be reduced by the following measures:

- Before construction activities begin to affect residential, commercial, and noise-sensitive receptors, these receptors should be given advance notice of the construction scheduled for their area, advised of the likelihood of high-noise levels, and informed of the measures taken to reduce noise impacts.
- Require the contractor to use the quietest types of equipment available. At a minimum, manufacturer-recommended silencers, mufflers, and acoustical enclosures and hoods must be properly installed and in good condition. It is recommended that all construction equipment be properly maintained in accordance with the manufacturer's suggested procedures, including proper fitting and use of noise suppression features and devices.
- Limit the hours of noisiest activities to daytime weekdays. It is recommended that the contractor be made aware of the noise standards and construction noise time-of-day limits for the City of Albuquerque and the Air Force. The contractor should be required to adhere to the noise standards or obtain the proper permits or variances that allow the holder to exceed noise levels or noise time limits.
- Require the contractor to provide temporary noise barriers to reduce construction noise impacts to sensitive receptors within 100 feet of noisy construction.

- Provide noise monitoring of sensitive receptor areas periodically during construction activities (all shifts), and report any excessive noise-producing activity. Require contractor to investigate and report on measures taken to properly reduce noise impacts.

6.4.2 Temporary Operation Noise Mitigation

The new flight patterns from Runway 17-35 to the north used by aircraft during shutdown of Runway 8-26 will cause significant noise impacts to nearby base and local community sensitive receptors. Noise abatement takeoff and landing procedures should be used. Flight tracks should be analyzed to minimize noise impacts to base and community receptors. Flight safety concerns should be addressed as well when evaluating noise mitigation measures.

Military touch-and-go operations may be reduced or eliminated from Runway 17-35 operations when runway 08-26 is closed to minimize noise impacts.

6.5 WATER RESOURCES

Soil erosion during construction activities should be minimized. The construction plan should explicitly indicate measures for controlling soil loss.

Construction activities on the drainage ditch of the Control Tower drain system should be scheduled for a period other than the rainstorm season to minimize erosion potential. In addition, a grass cover on ditch slopes will be needed to stabilize soils and accelerate development of vegetation.

Exposure of soils in areas where soil contamination is likely to be present, such as abandoned fuel lines, should be avoided during the rainy season, when runoff could become contaminated.

Spillage of petroleum fluids, cutting fluids, and hydraulic fluid is a likely risk over the 3-year period of construction activities. Risk of soils and runoff contamination by these products can be reduced by designing spill containment areas and developing a spill response plan to minimize the extent of contamination.

Construction plans for the storm water retention basin should specify a schedule of sediment removal to assure maintenance of storage capacity. The disposal site of removed sediment, and the need for physicochemical characterization of the sediment, should also be identified. The NPDES permit will stipulate sampling and analysis requirements for the storm water discharge.

The production well and groundwater monitoring wells located within the Taxiway E construction area will need to have their well casings extended up to the final ground surface elevation before construction activities are completed.

6.6 BIOLOGICAL RESOURCES

Construction areas designated for storage of equipment and materials should be selected from areas already disturbed to reduce the impact on desert grasslands.

Loss of the vegetation cover along the drainage ditch of the Control Tower drainage system should be minimized. Revegetation of the ditch slopes should be accelerated using a grass cover.

6.7 CULTURAL RESOURCES

No archaeological work is required along Taxiways A, AA, and E. Asphalt pavement, underground utility conduits, and drains exist in these areas, and any potential archaeological resources in these areas would have been seriously modified by grading and construction activities. In addition, no standing structures of historic significance will be affected by construction plans.

If the construction plan requires alteration of the Control Tower drainage system and modification of the output of waterflow into the arroyos south of Kirtland Road, a phase I archaeological survey will be required. As documented by an initial surface inspection, natural, undisturbed pediment surfaces exist on the banks of the arroyos. These ground surfaces may contain archaeological resources, as indicated by the presence of stone tools found during initial surface inspection. If archaeological resources are unearthed during construction, construction activities will be temporarily halted or redirected to another location until a qualified archaeologist and Native American observer have evaluated the find and allowed work to proceed in the area affected. In addition, the Air Force will consult with the State Historic Preservation Officer before resuming construction activities in the affected area.

6.8 SOCIOECONOMICS

The overall direct and induced socioeconomic effects of this project are beneficial impacts. Hence, no mitigation measures are needed.

6.9 TRANSPORTATION

Vehicular traffic congestion in and around KAFB during construction can be mitigated by implementing the following actions.

- Sprecker gate should be operated continuously during the day to direct construction traffic to the south end of the base. Confining this traffic to the Sprecker gate reduces the potential for congestion resulting from use of other gates at the base.
- Designate Sprecker gate as the sole entrance and exit for all heavy equipment. This will minimize the amount of heavy equipment traveling residential roads north of KAFB and reduce congestion at other gates.
- Provide additional manpower for registration and card checks at Sprecker gate during peak hours. This action will be effective in reducing waiting times at the entrance.

6.10 ENVIRONMENTAL MANAGEMENT

A spill control plan should be developed by the contractor for handling fuels, oils, and hazardous materials to reduce the risk of soil contamination.

Construction plans for the project will identify the disposal site for construction waste, and will specify waste disposal procedures. Asphalt should be recycled to reduce the need for waste disposal.

SECTION 7

PERSONS AND AGENCIES CONSULTED

The following individuals were consulted during the preparation of this environmental assessment.

7.1 U.S. AIR FORCE

7.1.1 Headquarters, Military Airlift Command

Capt Jim Pocock (HQ MAC/LEEVP)

7.1.2 Armstrong Laboratory Det 6

Capt Paul Scott (AL/EQE)

Maj Ramon Cintron-Ocasio (AL/EQE)

7.1.3 Kirtland Air Force Base

Maj Lon Badgett (1606th ABW/OT)

Maj French Clevenger (150th TFG/SE)

Harry Davidson (1606th ABW/EM)

Walter Darr (1606th ABW/EMC)

Clifford Richardson (1606th ABW/DEEV)

Chris Tuttle (1606th ABW/DEEV)

Lt Col William White (150th TFG/SE)

7.2 FEDERAL AGENCIES

7.2.1 Federal Aviation Authority

Ronald Flat

7.2.2 United States Fish & Wildlife Service, New Mexico Ecological Services

Ann Culley

Greg Fitch

Charlie McDonald

7.3 STATE AGENCIES

7.3.1 New Mexico Fish and Game Department

John Hubbart

7.3.2 New Mexico Environmental Improvements Department

Peter Monahand

Ernie Rebok

7.3.3 Nex Mexico Forestry and Resources Conservation Division

Robert Svensky

7.4 LOCAL AGENCIES

7.4.1 City of Albuquerque Department of Environmental Health, Air Pollution Control Division

Bob Harley

Roger Polisar

7.4.2 City of Albuquerque Environmental Health Department Consumer Protection Division

Hari Mukhoty

Bob Ramero

Jeff Sheka

7.4.3 City of Albuquerque Department of Public Works

Bill Westmorland

7.4.4 Albuquerque Aviation Department

Dennis Parker

Barry Kamhoot

7.5 OTHERS

Phillips Laboratory - Kirtland AFB

Paul Erickson

SECTION 8

REFERENCES

AIA, 1989. Federal Aviation Regulation Part 150, Noise Exposure Maps and Noise Compatibility Plan, Albuquerque International Airport, Greiner, Inc., 1989.

Badgett, 1991a. Maj Lon Badgett, KAFB 1606th ABW/OT, 26 April 1991 telephone communication with Anthony Davis, Engineering-Science (ES).

Badgett, 1991b. Maj Lon Badgett, KAFB 1606th ABW/OT, 6 March 1991 telephone communication with Anthony Davis, ES.

Badgett, 1991c. Maj Lon Badgett, KAFB 1606th ABW/OT, 11 July 1991 telephone communication with Anthony Davis, ES.

Badgett, 1991c. Maj Lon Badgett, KAFB 1606th ABW/OT, 11 July 1991 personal communication with Anthony Davis, ES.

BCPWD, 1991. Bernalillo County Public Works Department. Rio Bravo East, I-25 to Gibson Blvd., June 1990, Review Documentation, Comment and Responses, January 1991.

CERL, 1978. Construction Engineering Research Laboratory, Interim Report 36, Construction Site Noise: Specification and Control, Construction Site Noise Control Cost-Benefit Estimating Procedures, by F.M. Kessler, P.D. Schomer, R.C. Chanaud, and E. Rosendahl, January 1978.

COE, 1979. Corps of Engineers, Herkenhoff and Associates, and Geohydrology Associates, 1979, Albuquerque Greater Urban Water Supply Study, Albuquerque, NM.

Culley, 1991. Ann Cully, botanist, U.S. Fish and Wildlife Service, Ecological Services field office, Albuquerque, NM., 10 June 1991 telephone communication with Carlos Victoria, ES.

Davidson, 1991. Harry Davidson, KAFB 1606th ABW/EM, personal communication with Carlos Victoria, ES, 12 April 1991.

EHD, 1975. City of Albuquerque, Environmental Health Department, Consumer Protection Division, Noise Control ordinance, ordinance No. 21-1975, chapter 6, article 22, 1975.

FHWA, 1982. Federal Highway Administration, Federal-Aided Program Manual. Volume 7, Right-of-Way and Environment, Chapter 7 Environment;

Section 3, Procedures for Abatement of Highway Traffic Noise and Construction Noise.

GSA, 1975. United States General Services Administration, Construction Equipment Practices, 1 January 1975.

Harris, 1979. C.M. Harris, *Handbook of Noise Control*, second edition, PPS 31-4, 1979.

Hider, 1991. Maj Al Hider, KAFB 1606 ABW/SE, 10 June 1991 telephone conversation with Anthony Davis, ES.

Kamhoot, 1991a. Barry Kamhoot, AIA, personal communication with Anthony Davis and R.C. Wooten, ES, 5 March 1991.

Kamhoot, 1991b. Barry Kamhoot, AIA, 6 June 1991 telephone communication with Anthony Davis, ES.

Kamhoot, 1991c. Barry Kamhoot, AIA, 1 August 1991 telephone communication with Anthony Davis, ES, and facsimile of runway utilization information during construction.

Mariah Associates, 1988. An Assessment of Cultural Resource Studies Conducted at Kirtland Air Force Base, Bernalillo County, New Mexico. Prepared by Mariah Associates, Inc., June 1988.

Martin and Wagner, 1974. W.C. Martin and W.L. Wagner, Biological Survey of Kirtland AFB (East), Sandia National Laboratories Report SAND74-0393, Albuquerque, NM, December 1974.

Molzen-Corbin, 1990. Preliminary Engineering Report, Albuquerque International Airport, Proposed Improvements to Taxiway A and E. Prepared by Molzen-Corbin & Associates, December 1990.

Monahand, 1991. Peter Monahand, New Mexico Environmental Improvements Department, 23 May 1991 telephone communication with Anthony Davis, ES.

MRGCG, 1988. 1988 Socioeconomic Estimates for State Planning and Development District 3 by Data Analysis Subzones. Middle Rio Grande Council of Governments of New Mexico, July 1989.

MRGCG, 1989a. 2010 Socioeconomic Forecasts for State Planning and Development District 3 by Data Analysis Subzones. Middle Rio Grande Council of Governments of New Mexico, December 1989.

MRGCG, 1991. Summary of 1990 Census Public Law Data for New Mexico State Planning and Development District 3. Middle Rio Grande Council of Governments of New Mexico, March 1991.

Pearsons, 1989. K. Pearsons, D. Barken and B. Tabachnik. "Analysis of the Predictability of Noise Induced Sleep Distrubance." (NSBIT Report No. HAD-TR-89-029).

Richardson, 1991. Clifford Richardson, KAFB 1606th ABW/DEEV, personal communication with Carlos Victoria, ES, 12 April 1991.

Scanlon & Associates. 1990. Corridor Analysis Report, Rio Bravo East, I-25 to Gibson Blvd., Bernalillo County Public Works Department, June 1990. Prepared by Scanlon & Associates, Inc.

State of New Mexico, 1991. Endangered species list provided by John Hubbart, New Mexico Fish and Game Department, 6 May 1991.

Svensky, 1991. Robert Svensky, Botanist, New Mexico Forestry Division, 6 May 1991 telephone communication with Carlos Victoria, ES.

Tuttle, 1991. Chris Tuttle, KAFB 1606th ABW/DEEV, 25 April 1991 telephone communication with Anthony Davis, ES.

USAF, ND. United States Air Force, Draft Fish and Wildlife Management Plan, Kirtland Air Force Base, New Mexico, Category I, Plan Period 5 Years.

USAF, 1978. United States Air Force, An Intensive Archaeological Survey of a Portion of Kirtland Air Force Base, New Mexico. Prepared by J.B. Rodgers, Center for Anthropological Studies, 1978, Albuquerque, New Mexico.

USAF, 1981. United States Air Force, Installation Restoration Program, Phase I: Records Search, Hazardous Materials Disposal Sites. Draft Report for Kirtland AFB, November 1981.

USAF, 1985. United States Air Force, Installation Restoration Program, Phase II: Confirmation/Quantification, Stage 1. Final Report for Kirtland Air Force Base, March 1985.

USAF, 1990a. United States Air Force, Preliminary Final Environmental Impact Statement, Proposed Closure of Los Angeles AFB, California and Relocation of Space Systems Division, October 1990.

USAF, 1990b. United States Air Force, Environmental Assessment of the Realignment of Units at Kirtland Air Force Base, New Mexico, Department of the Air Force Headquarters, Military Airlift Command, Scott Air Force Base, Illinois, April 1990.

USAF, 1991a. United States Air Force, Installation Restoration Program, Stage 2A, Work Plan, U.S. Geological Survey-Water Resources Division, Draft 2, Albuquerque, New Mexico, February 1991.

USAF, 1991b. United States Air Force, Environmental Assessment of the Proposed Consolidation of the Phillips Laboratory, Kirtland Air Force Base, New Mexico, January 1991.

White, 1991. Lt Col William White, NMANG 150th TAG/SE, 11 March 1991 personal correspondence with R.C. Wooten, ES.

SECTION 9

LIST OF PREPARERS

Name	Degree	Professional Discipline	Years of Experience	Responsibility
Alexis Alfasso	B.A., English	Technical writer	6	Technical writer
Khursheed K. Chosky	B.A., economics	Economist/ demographer	3	Socioeconomics
Anthony C. Davis, P.E.	B.S., civil engineering	Civil/environmental engineer	14	Aircraft operations Project manager
James A. Garrison, P.E.	Ph.D. pending, environmental engineering	Air quality engineer	15	Air quality
Marland E. Hale	Ph.D., mechanical engineering	Mechanical engineer	24	Noise
David Harris	B.S., light building industry	Acoustical engineering	30	Noise
Michael D. Petraglia	Ph.D., archaeology	Anthropology/ archaeology	4	Archaeology
David E. Schanzle	B.S., chemical engineering	Chemical engineer	3	Air quality
Carlos Victoria-Rueda	Ph.D. pending, civil engineering	Biology/ water resources	5	Water resources Biological resources Wastewater management
Rutherford C. Wooten	Ph. D., ecology/ biology	Environmental scientist	29	Technical director

Appendix A

National Historic Preservation Act:
Section 106 Consultation Initiation

STATE OF NEW MEXICO
OFFICE OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION

BRUCE KING
GOVERNOR

VILLA RIVERA, ROOM 101
228 EAST PALACE AVENUE
SANTA FE, NEW MEXICO 87503
(505) 827-6320

HELMUTH J. NAUMER
CULTURAL AFFAIRS OFFICER

THOMAS W. MERLAN
DIRECTOR

July 8, 1991

Ricardo Sotelo, PE
Director
Engineering, Construction and
Development Directorate
Headquarters, 1606th Air Base Wing (MAC)
Kirtland Air Force Base, New Mexico 87117-5000

Re: Extension of Taxiways A and E and alteration of Taxiway AA

Dear Mr. Sotelo:

This office has reviewed the report, "Preliminary Final Environmental Assessment for the Repair and Extension of Taxiways A, AA, and E."

The area of the proposed project is not within the boundaries of a district listed in the National Register of Historic Places. There are no individually listed properties or known eligible properties in the immediate project area.

We concur that if the construction plans call for alteration of the drainage system or increased output of water flow into the arroyos south of Landfill 1 or Kirtland Road near the Control Tower, a phase I archaeological survey will be required.

For whichever alternative may be chosen, if during construction, significant archaeological resources are discovered, they should be protected in place and this office notified immediately.

If you have any questions about these comments, please let us know.

Sincerely,

Lynn Sebastian

for Thomas W. Merlan
State Historic Preservation Officer

TWM/MAA
Log #31508

Appendix B

Endangered Species Act:
Section 7 Consultation Initiation

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
Suite D, 3530 Pan American Highway, NE
Albuquerque, New Mexico 87107

August 7, 1991

Cons. #2-22-91-1-257

Mr. Ricardo Sotelo, Director
Department of the Air Force
Headquarters 1606th Air Base Wing (MAC)
Engineering, Construction and
Development Directorate
Kirtland Air Force Base
New Mexico 87117-5000

Dear Mr. Sotelo:

This responds to your letter dated July 29, 1991, requesting comments on the Preliminary Final Environmental Assessment for the Repair and Extension of Taxiways A, AA, and E at the Albuquerque International Airport. The proposed action involves leasing 46 acres of Air Force land to the airport for 20 years for construction of these taxiways. The action also involves relocation of the Air Force Base Operations facility, upgrading the runway drainage system, and constructing a retention basin for runoff water. Your geographic area of interest is Bernalillo County, New Mexico.

We have several concerns about the Preliminary Final Environmental Assessment (EA) for this project. The EA does not provide a list of flora and fauna that will be removed or displaced by the extension of taxiways and renovation and construction of the drainage system and retention basin. The EA does not indicate whether all areas of potential disturbance were surveyed in the "biological walkover" referred to on page 4-22 of the document, nor does it give the season of the year when the walkover occurred. Seasonality of surveys is important for detecting certain taxa. For example, grama grass cactus (Pediocactus papyracanthus) is very diffucult to see and can most easily be found in the spring and early summer when the plants are swollen with moisture and in flower.

In addition, we are concerned about the runoff water which currently flows into tributaries of the Tijeras Arroyo from Runway 8-26. A retention basin for the Control Tower Drain System, which drains the western portion of the runway, is proposed as part of this project. We recommend that this retention basin be large enough to contain the runoff water with no release into the Tijeras Arroyo. Water should be held in the basin until it is evaporated so that no contaminants from fuel, oil, grease, or chemicals from the Fire Training Center enter the watershed of the Rio Grande via the Tijeras Arroyo.

No retention basin is proposed for the Landfill Drain System which drains the eastern portion of Runway 8-26. We recommend that the storm waters from this system be tested for contaminants which may be picked up in the runway area and from Landfill 1, and that a retention structure be built to prevent chemicals from entering the watershed. If the water in the retention basins maintains an oily sheen indicating the presence of petroleum products, the basins should be covered with netting to prevent harm to wildlife.

Wetlands, riparian vegetation, and other sensitive wildlife habitat on or near the site should be protected. If impacts cannot be avoided, a mitigation plan should be developed to compensate for wildlife losses.

The list of persons and agencies consulted (page 7-1) does not include the U.S. Fish and Wildlife Service. It also does not include the New Mexico Forestry and Resources Conservation Division, although this agency appears in the references section (page 8-2) under the name T. B. Svensky. This individual's name is actually Robert Sivinski.

We recommend that you contact the New Mexico Department of Game and Fish and the New Mexico Energy, Minerals and Natural Resources Department for information concerning fish, wildlife, and plants of state concern.

If we can be of further assistance, please call Anne Cully at (505) 883-7877 or FTS 474-7877.

Sincerely,

Jennifer Fowler-Propst
Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals and Natural Resources Department, Forestry and Resources Conservation Division, Santa Fe, New Mexico
Regional Director, U.S. Fish and Wildlife Service, Fish and Wildlife Enhancement, Albuquerque, New Mexico